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An individual's decision-making process is defined as sets of temporally sequential subprocesses by which he receives, evaluates, and acts on information under conditions of uncertainty. The stages of this process are initial choice, analysis and synthesis. A modified version of Form E of the Dogmatism Scale and an original Political Issue Experiment were administered to 1,051 male and female students in grades nine through twelve of six public high schools in five Michigan communities. The Two Person Game experiment developed by Dawson was also used. Three hypotheses were tested: (1) both open and closed minded persons without information will choose in accordance with authorities, (2) closed minded people using authority's information complete the analysis stage at a later point than open minded people, (3) closed minded people, using authority's information, complete the synthesis stage at a later point than open minded people. Hypothesis Two and Three were not supported by data. (Author/KJ)

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(Ph.D. Thesis: THE EFFECTS OF EXPERT POWER AND DOGMATISM ON A PROCESS OF INDIVIDUAL DECISION-MAKING)

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U.S. DEPARTMENT OF
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FINAL REPORT

Project No. 7-E-009
Grant No. OEG-3-7-0700009-1644

A STUDY OF HIGH SCHOOL STUDENTS' SOURCES OF AUTHORITY INFORMATION AND THEIR RESISTANCE TO THESE SOURCES

(Ph.D. Thesis: THE EFFECTS OF EXPERT POWER AND DOGMATISM ON A PROCESS OF INDIVIDUAL DECISION-MAKING)

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East Lansing, Michigan

March 1969

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U.S. DEPARTMENT OF
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ABSTRACT

THE EFFECTS OF EXPERT POWER AND DOGMATISM ON A PROCESS OF INDIVIDUAL DECISION-MAKING

by Paul A. Dawson

This study investigates the effects of the expert power of an authority and the dogmatism of an individual on stages of the individual's decision-making process.

An individual's decision-making process is defined as sets of temporally sequential subprocesses by which he receives, evaluates, and acts on information under conditions of uncertainty. The stages of this process are initial choice, analysis - the selection of a response tactic, and synthesis - the selection of a response strategy. The major research problem is to determine whether (1) the perceived expert power of an authority who provides the subject with incorrect information, and (2) the subject's degree of dogmatism have an adverse effect on the subject's initial response, the point at which the subject completes the analysis stage, and the point at which the subject completes the synthesis stage. Two experimental procedures are used to test the following hypotheses. Hypothesis I: Both open and closed minded persons will first choose in accordance with an authority's information when they do not have any information about the actual consequences of alternative responses in a decision-making situation. Hypothesis II: Closed minded persons who use information from an authority will complete the analysis stage at a later point in their decision-making process than will open minded persons who do not use information from an authority. Hypothesis III: Closed minded persons who use information from an authority will complete

the synthesis stage at a later point in their decision making process then will open minded persons who do not use information from an authority.

A modified version of Form E of the Dogmatism Scale was administered to 1051 male and female high school students in grades nine through twelve of six public high schools in five Michigan communities. The first experimental procedure consisted of an original Political Issue Experiment (PIE). The Dogmatism Scale and the experiment was administered to entire classes in courses that were required at each grade level in the six high schools.

The S first read a statement which indicated that the United States should stay and fight in Viet Nam until the communists stop trying to take over that country. In the treatment version, this statement was attributed to President Johnson; in the control version, the statement was not attributed to any source. The S then took either a pro or a con position on the Viet Nam issue by indicating whether he agreed or disagreed with the original statement. After indicating his own position, the S encountered thirteen new statements which tended to contradict his own position on the issue. These statements were not attributed to any source and were presented one at a time. After reading each statement, the S indicated whether he wanted to : (1) change his original position; (2) keep his original position; or (3) was unsure about changing or keeping his original position. The thirteen statements in the PIE instrument were ordered in terms of increasing severity, i.e., statements which least strongly contradicted the S's position occurred first and statements which most strongly contradicted the S's position occurred last. The thirteen statements were presented to the S under the pretext that the researchers wanted the S to answer some general open-ended questions about the Viet Nam situation. Since the researchers realized (the S is told) that some students know more than others about Viet Nam, all students will first read some statements about Viet Nam and then go on to answer the general questions. After reading each statement, the S is asked to indicate whether he would not change his original position, keep his position, or is uncertain one way or the other. Subjects are asked to indicate one of these three responses under the pretext the researchers want the S to use such a response scheme to indicate how important the S thinks each statement is.

The second experimental procedure consisted of a Two-Person Game (TPG) experiment which I designed to provide a realistic minimal social situation in which the effects of expert power and dogmatism could be determined with a high degree of control. The design provides for pre-programming of the choices of the "other player" and therefore permits variable levels of reinforcement of S responses. Casual normative social influences are minimized in the TPG experiment by the use of four Ss in a non face-to-face group which is not under surveillance by the experimenter-authority.

The experimenter administers the authority treatment in the TPG experiment. The design of the experiment calls for the experimenter to establish his expertness in the eyes of the Ss by telling them that he developed the game which they are about to play. The authority treatment is information which the experimenter gives the S. The information provided by the experimenter is a statement of his observations of the choices of other students who have taken the position of the other player in the TPG. This information states that the persons who takes the position of the other player is more likely to choose *C* than *D* and that therefore the *S*, in the long run, will win more points if he always chooses *B*.

The reinforcement conditions are designed to systematically contradict the *S's* beliefs about the expected relative frequency of the other player's *C* and *D* choices and about the choice which he should make. In all reinforcement conditions, the other player chooses *D* more often than he chooses *C*. Since *Ss* in both the treatment and control conditions of the experiment are likely to have the opposite belief about the relative frequency of the other player's choices, the reinforcement conditions (1) negatively reinforces the *S's* beliefs and the choices which he bases on those beliefs, and (2) lets the *S* perceive for himself information which is inconsistent with his initial beliefs. A different non-contingent reinforcement schedule was used in each of three different reinforcement conditions. In reinforcement condition I, the other player chooses *D* 99 times out of 100; in reinforcement condition II, 90 times out of 100; and in reinforcement condition III, 80 times out of 100. Under each reinforcement schedule, it is very likely that the *S's* *B* choice will be negatively reinforced on any given trial and that the *S's* decision to consistently choose *B* will definitely be negatively reinforced.

The experimental design of the TPG experiment has six experimental conditions. These six conditions results from (1) the authority treatment and control conditions and (2) the administration of one of the three reinforcement schedules. Subjects participated in the TPG experiment during the class hour in which they had volunteered. From each class, experimental groups of four students each were created by a random sample of male and female volunteers. From each class, experimental groups were first randomly assigned to treatment and control conditions of reinforcement schedule I, then to treatment and control conditions of reinforcement schedule II, and finally -- if there was a sufficient number of students who had volunteered -- to treatment and control conditions of reinforcement schedule III.

In an attempt to control for the unreliability of the Dogmatism Scale and for the possible effects of grade level and school membership, the analysis is based on the responses of Ss who scored either extremely high or low on the Dogmatism Scale with respect to their school-grade level mean score on the scale. Extremely closed or open minded Ss scored in the upper or lower quartile of the distribution of scores for all students of the same grade in the same school. A total of 259 Ss were selected as extremely high on dogmatism (close-minded) and a total of 258 Ss as extremely low (open-minded).

The hypothesis of a main effect of expert power on the initial stage of the S's decision-making process, irrespective of the open or closedness of the S's belief system (Hypothesis I) was tested and confirmed in the TPG experiment. A total of 218 Ss participated in the three reinforcement conditions of the TPG experiment. The analysis of the S's response on Trial 1 shows that both open and closed minded persons are equally willing to accept and act on information from an authority. On the first trial, 98.01% of all Ss who received the authority's information chose the suggested response alternative whereas only 55.14% of Ss in the control condition chose this alternative. This difference between treatment and control conditions of the TPG experiment is highly significant ($t = 8.57$; $p \ll .001$).

The hypothesis of an interactive effect of expert power and dogmatism on the point at which the analysis stage is completed (Hypothesis II) was tested in both the TPG and PIE experiments. An analysis of variance for each reinforcement condition of the TPG experiment failed to support the hypothesis. While no interactive effect was found, the perceived expert power of the authority did have a significant main effect of retarding completion of the analysis stage by both open and closed minded persons. No interactive or main effect was found in either condition of the PIE experiment.

The hypothesis of an interactive effect of expert power and dogmatism on the point at which the synthesis stage is completed (Hypothesis III) was also tested in both the TPG and PIE experiments. An analysis of variance for each reinforcement condition of the TPG experiment failed to support the hypothesis. In addition, no main effect reached an acceptable level of significance. The results of tests of Hypothesis III in both conditions of the PI experiment were equally non-significant.

THE EFFECTS OF EXPERT POWER
AND DOGMATISM ON A PROCESS
OF INDIVIDUAL DECISION-MAKING

By

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PREFACE

This is a study of variables which affect individual decision-making behavior. While many political scientists believe that decision-making processes are central to the concerns of the discipline, they differ in their use of the concept and in the approaches which they use to investigate decision-making processes. The following introductory section to this dissertation has two major purposes. The first of these is to illustrate the relevance which the concept of decision-making has for our discipline and to identify several approaches to the study of decision-making. I will discuss certain characteristics of these different approaches and evaluate the utility of each approach. In general, the utility of each approach is found in the way it conceptualizes decision-making behavior and in the questions it asks about that behavior. The discussion of these alternatives will serve as a background against which I will present my own - somewhat different - approach. The second and more important purpose of the following section will be to serve as an introduction to the theoretical approach of this study.

The second and major purpose of the following introduction is to present my conceptual definition of individual decision-making and in particular to (1) discuss the nature of my conceptualization of individual decision-making and (2) show three ways in which my conceptualization of that process affects the approach of this study. First, the conceptual definition of an individual's decision-making process leads directly to the questions which I asked about that process. Second, the definition suggests relevant independent variables which may affect an individual's decision-making process. Third, in conjunction with the suggested independent variables, the conceptual definition leads to the theoretical rationale and operational definitions of this study.

In Chapter I, I will review literature which is relevant to, and which justifies the inclusion of, the two independent variables - expert power and dogmatism - which are used in this study. This chapter concludes with a summary on the state of the relevant literature. This concluding summary will provide a framework for the theoretical rationale and for the research problems and hypotheses which are derived from the rationale.

The theoretical rationale for this study and the research problems and hypotheses which the study investigates are developed and specifically stated in Chapter II. The operational definitions which were used to test specific hypotheses are also presented in Chapter II.

Chapter III consists of the research design and the formal methodology which was used to pre-test original instruments which

I developed and to test specific hypotheses.

Chapter IV presents results of the analysis and results of tests of hypotheses.

In Chapter V, I will discuss how the obtained results bear on the hypotheses, research problems, and theoretical rationale of this study.

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INTRODUCTION

Political scientists who are concerned with decision-making tend to evaluate the relevance of the concept for the discipline as a whole. These political scientists conclude that the concept of decision-making is central to the concerns of the discipline. Herbert Simon (1966) views the concept as the central "core aspect" of political science. William Riker (1962), who shares Simon's evaluation, identifies, in the works of David Easton, a general focus of political science on decision-making. Riker's interpretation of Easton's work is as follows:

> Now if, as Easton asserts, politics is the authoritative allocation of values and if, as I interpret it, "allocation" refers not to a physical process but to the social process of deciding how a physical process shall be carried out, then the subject studied by political scientists is decision-making. (1962, p. 10)

The above very favorable evaluations of the relevance of the concept of decision-making are made by respected political scientists. I am sure that other political scientists do not share these evaluations and would argue in favor of the concepts with which they are most concerned. While an argument about the relative importance of any concept might illuminate the varied concerns of political scientists, I doubt that such an argument would result in agreement on what is, or should be, the central concern of the discipline. In any event, agreement about the central concerns of the discipline would be at least premature and perhaps damaging to scientific progress. If the concept of decision-making is relevant for political science, such relevance is not found in simple evaluative statements but in an understanding of the way in which political scientists use the concept. I shall therefore examine certain characteristics of approaches which use the concept of decision-making and evaluate the utility of these approaches.

A major characteristic of any decision-making approach is its level of analysis. All decision-making approaches to the study of political phenomena are attempts to describe and account for various human choice behaviors and/or various operations of the political system. Decision-making approaches focus on human choices under conditions of uncertainty and/or on operations of the political system resulting in an "allocation" of values. Decision-making approaches may therefore proceed at any of three levels of analysis. A decision-making approach may focus primarily on (1) the choices made by individuals under conditions of uncertainty, i.e. those conditions which result in uncertainty of individual judgement, (2) the choices made by some institutional part of the political system about an allocation of values (choices also made under conditions of uncertainty about probable consequences), or (3) the choices made by individuals at some institutional level in the political system about an allocation of values.

It is possible to argue, on a priori grounds, that a particular level of analysis is more relevant for the discipline as a whole. It is more logical to describe and account for the interaction of the choices of individuals and the operations of the political system than it is to deal with either of these two factors separately.

This is true since individuals are likely to behave differently in different situations and the operations of the political system are after all carried out by individuals. Richard Snyder (1958) has such an orientation to focus on the interaction of individual choices and selected aspects of the political system. Snyder shows such an orientation in his criticism of the way the concept of decision-making has traditionally been used in the fields of public administration, judicial behavior, and international relations. Snyder's criticism is that most writers use the concept to refer only to the substance of decisions and the formal structure within which decision-making takes place. He suggests that systematic use of the concept would require political scientists to be as equally concerned with variables that affect the choices of individuals in decision-making situations as they are with the formal characteristics of such situations. Richard Snyder states his preference for the interactional approach which focuses on the choices of individuals in the operation of the political system. Snyder identifies this focus in what he calls "two fundamental purposes of the decision-making approach:"

> to help identify and isolate the "crucial structures" in the political realm where change takes place -- where action is initiated and carried out, where decisions must be made; and to help analyze systematically the decision-making behavior which leads to action and which sustains action. (1958, p.15)

There is an advantage to such an interaction approach that focuses on those choice behaviors which occur within crucial decision-making structures of the political system. The advantage lies in the realization that individual choices which are made in such a structural context are likely to be of a particular form which they would not otherwise be. There are also certain disadvantages to an interactional approach. First, although such an approach may help to identify and isolate important structural parts of the decision-making process in the political system, these have not thus far been adequately identified or conceptualized. In effect, since our knowledge about the nature of the structural context is quite inadequate, understanding of the effects which that context may have on choice behavior can hardly be expected. A second disadvantage of the interactional approach is that an attempt to identify and isolate "crucial structures" may restrict too narrowly the set of operations of the political system that involve decision-making. Similar caveats are in order about the other factor in Snyder's interaction approach, the decision-making behavior which leads to and sustains action. Even if such behaviors were successfully identified, it does not necessarily follow that such behaviors are the only ones of potential interest to political scientists who are concerned with decision-making.

In conclusion, the concept of decision-making is relevant for use by political scientists because of the purposes to which it lends itself. First, the concept does refer to what seem to be central processes within the political system. Second, and more importantly, previous use of the concept of decision-making suggests an approach which is able to relate the choice behavior of individuals to the political system within which such behavior occurs. While these two aspects of usage of the concept are of direct relevance to the concerns of political scientists, I have suggested that an attempt to capitalize on this relevance will encounter various difficulties.

An alternative strategy would be to focus on the choices which individuals make in situations in which it is possible to determine the nature of the situation and to isolate the factors in the situation which are affecting individual choice behavior. In so far as possible, such an alternative research strategy should use situations which in certain respects are analogous to situations found in the political process. While such an approach may be of less direct relevance to the major concerns of the discipline, this alternative way of proceeding is more workable than the approach outlined above by Snyder. My hope in adopting this alternative approach is that it will provide systematic knowledge about individual decision-making and that this knowledge will facilitate work on the concerns which are of more direct relevance to other political scientists.

In general, my approach in this study is to focus on a process of individual decision-making which occurs in situations which are analogous in certain respects to situations likely to exist in the political process. Although my approach is similar to what I have previously identified as an interaction approach, I do not claim that the situational variables used in this study are identical to any formal characteristic or "crucial structure" in the political system. The question of how one can extrapolate findings from controlled situations which are analogous to those of the political system to actual situations in the political system is of course important but beyond the scope of this study. My only other purpose in this section is to introduce the reader to the theoretical approach on which I have based this study. This introduction will be made by way of presenting my conceptualization of individual decision-making, showing how the conceptualization guided the development of the approach, and refining the conceptualization with a specific conceptual definition.

Originally, my implicit conceptualization of the nature of an individual's decision-making process focused on the cognitive operations which individuals perform. In general, the cognitive operations of an individual consist of the processes by which the individual is able to orient himself to reality. Specifically, cognitive processes are those of perceiving, thinking, and knowing. The process by which individuals receive and process information is basic to each of these operations. My conceptualization of individual decision-making therefore focused specifically on the process by which individuals receive, evaluate, and act on the basis of information which is available to them under conditions of uncertainty, i.e. under conditions in which individuals are in doubt about the best or most rewarding choice which they can make.

This conceptualization of an individual's decision-making process guided the formation of my approach in the following three ways. The conceptualization first led directly to the following questions about an individual's decision-making process: (1) What are the sources from which individuals may receive information in decision-making situations? (2) Does the identity of a source of information affect the manner in which individuals receive or evaluate the information? (3) Do individuals differ in their receptivity to information from various sources or in their propensities to evaluate information from various sources?

Further, my conceptualization focused attention on two areas of social psychology which suggested factors likely to affect such an individual decision-making process. The first area deals specifically with conditions of uncertainty, i.e. with the nature of conditions under which individuals experience uncertainty in their judgment and with the means by which individuals are able to resolve such uncertainty. A great deal of literature in this area suggested that one of the more important means by which individuals are able to resolve their uncertainty of judgment is to rely on other individuals for information about how to behave. By employing this means of resolving uncertainty of judgment, an individual relies more on the cognitive processes of others and less on his own.

The second area of social psychology to which my attention was directed deals with personality characteristics which are related to how individuals process information which they receive from various sources. The literature suggested a personality variable related to how receptive individuals will be to information from various sources. Furthermore, this personality variable is also related to differences in the way in which information is evaluated depending on whether the information came to the individual as a result of his own experiences and perceptions or was communicated to the individual by some other source. Each of these areas of social psychology led to my selection of two independent variables which are likely to affect an individual's decision-making process. Respectively, these independent variables are (1) the authoritative nature of a personal source from whom an individual may receive information about appropriate action in a decision-making situation, and (2) the degree of dogmatism which characterizes an individual's cognitive processes.

The third effect which my conceptualization of an individual's decision-making process had on the approach of this study came about in conjunction with the factors which were suggested as relevant independent variables. The joint effect of the conceptualization and the independent variables was to lead to (1) the theoretical rationale for this study, and (2) the operational definitions which could be used to test for the effects of the independent variables on various aspects of an individual's decision-making process.

I have not attempted to present some universal formulation of an individual's decision-making process. I am more interested in presenting a formulation which is analytically useful for the understanding of individual choices under certain politically relevant conditions. Conditions of uncertainty in which individuals may rely on directives from some personal source in a position of authority are politically relevant and analogous to many situations in the political process.

My final purpose in this introductory section is to present formal conceptual definition of an individual's decision-making process. The use to which I will put the conceptual definition is in keeping with the general concerns of decision-making approaches.

Herbert Simon has written that, narrowly defined, "...decision theory is concerned with the selection of an optimal course of action from among a set of specified alternative courses of action, on the basis of a criterion of preference." (1966, p.18. Emphasis mine) For analytical purposes, I have broken down this selection process into several sub-processes. An individual's decision-making process, accordingly, is a sequence of subprocesses by which an individual receives, evaluates, and acts on information under conditions in which the individual experiences uncertainty of judgment about a set of alternative courses of action. This definition will be used in order to describe and account for the joint or interactive effect of a situational and personality variable on the sub-processes of individual decision-making. The study is specifically concerned with the joint effects of (1) the act of a person in a position of authority who provides information about alternative courses of action, and (2) dogmatism as a measure of an individual's cognitive structure on the different sub-processes of individual decision-making.

CHAPTER I

A Review of Related Literature

As I have previously mentioned, my conceptualization of the nature of an individual's decision-making process was the initial basis for the selection of the two independent variables. This chapter reviews relevant literature which justifies the way I have used the independent variables. This review is limited in scope because it only includes those studies in which the independent variables are related to the choices of individuals. The review will show how each of the variables has been identified and used, what effects the variables were found to have on the choices of individuals, and what underlying mechanisms have been postulated to account for the observed effects. The review will proceed by considering, in turn, literature which deals with (1) the influence of persons who have some authority, (2) dogmatism as a measure of an individual's cognitive structure, and (3) relationships between the authoritative nature of sources of information and the psychological measure of dogmatism. At the end of this chapter, I will summarize the reviewed literature as it applies to individual choice behavior. The concluding summary will serve as a basis for the theoretical rationale of this study.

This examination of the influence which some persons exercise over the choices of others and of the characteristics of persons who exercise influence cannot proceed without making some important distinctions. In the first place, I think it is necessary to distinguish between influence processes which involve an overt communication from those which do not. Such a distinction is made by Morton Deutsch and Harold Gerard (1955) in a work entitled "A study of normative and informational social influences upon individual judgement." These authors define informational social influence as "an influence to accept information obtained from another as *evidence* about reality" and normative social influence as "an influence to conform with the positive expectations of another." (p.629) Here the distinction is in the role performed by the person who exercises influence. A person exercises informational social influence if he communicates some information to an individual and if the individual accepts that information as fact and acts on that basis. On the other hand, a person exercises normative social influence if he has some expectations about another person's behavior and if that person, perceiving those expectations, fulfills them and thus conforms. This review will deal only with studies in which informational social influence is the central feature of the interaction between a person who exercises influence and one who is influenced. Such a restriction of the scope of this review is not intended to suggest that the two types of influence are independent of each other. Deutsch and Gerard themselves recognize that casual normative influences are likely to operate in most interactions among individuals. The authors feel that this is so because individuals tend to attribute expectations to other persons and try to conform with them.

A second and final distinction among influence processes follows from the first. It concerns differences between the perceived characteristics of persons exercising *informational* and those exercising normative social influence. Only perceptions of the second kind, i.e. in informational influence situations will be considered here.

Of these various characteristics of persons who exercise informational social influence, I am primarily concerned with their expertise or informational competence. Since it is rather awkward to refer to individuals as "persons who exercise informational social influence," I will subsequently refer to such individuals as authorities. This latter usage follows Milton Rokeach's definition of an authority as "any source to whom we look for information about the universe, or to check information we already possess." (1960, p.43) The remainder of this discussion of authorities who are perceived to have expertise as sources of information will focus on the process by which other individuals are affected by their information.

John French and Bertram Raven speak of the characteristics of any person who exercises influence as bases of power. It was French and Raven who pioneered work on the characteristics of individuals who possess power and are thereby able to exercise influence over others. In their theoretical essay, "The bases of social power" (1959), French and Raven identify five such characteristics or bases of power. Only one of these is directly related to the exercise of informational social influence. The authors term it expert power. The best definition of expert power is given not by French and Raven themselves but by John Schopler in a review of literature on "Social power." (1965). Schopler defines expert power as:

> Expert power exists when B (the potential recipient of information) perceives A (the potential source of information) as possessing knowledge or skills in a particular area. B must also believe that A is being truthful and is acting in good faith. The exercise of expert power does not

> depend on maintaining surveillance (by A over B) and the range of power is thought to be limited to the areas of A's expertness, although some generalizations may occur to other areas. (p.182)

This definition makes it clear that for a person to exercise informational social influence, he must be perceived by the person who is subject to that influence attempt as having expertise, being truthful in conveying information based on his expertise, and not attempting to manipulate, for his own purposes, the recipient of the information. If the source of information is perceived in such a manner, then the recipient of the information will make choices on the basis of the information.

Schopler notes that "(T)he effectiveness of expertness as a base of power has been frequently demonstrated in studies using the closely allied concepts of 'perceived competence,' 'credibility,' or 'skill'." (p.200) Schopler discusses a number of studies in which these aspects of expert power do affect the choices of individuals in the direction which would be predicted by French and Raven.

In his excellent summary, Schopler cites a study by Croner and Willis, "Perceived differences in task competence and asymmetry of dyadic influence," (1961) which showed that the generality of an individual's expert power is limited to certain areas of expertise. The study "...showed that a stooge whose performance is presented as being good on one task will be able to exert influence on a subsequent task. Their study takes on added significance because they show the relationship holds only when the second task is comparable to the first. They substantiate French and Raven's (1959) prediction that the scope of expertness is limited to the areas on which the expertness is based." (Schopler, 1965, p.200) A second study is noteworthy because it bears on the elements of trustworthiness and lack of manipulative intent which are characteristics of individuals who possess expert power. In a study by Elaine Walster and Leon Festinger, "The effectiveness of 'overheard' persuasive communications" (1962), "subjects who thought they were 'overhearing' a group discussion containing persuasive information, showed more attitude change than subjects who heard the identical discussion, but thought the participants were aware of their presence. Walster and Festinger conclude the effect, which holds up only for issues in which the persons is involved, represents the enhancement of influence by a source that has no apparent motive to influence." (p.200) In this situation, subjects apparently thought that if information was not directed at them then the source of that information lacked manipulative intent, i.e., did not intend to gain by their being influenced by the information.

Herbert Kelman, in an article on "Processes of opinion change" (1961), has identified three processes by which social influence may occur. Of the three, the one process which Kelman identified as internalization is most relevant for this discussion of how individuals are affected by information received from an authority. Kelman says that internalization of social influence "can be said to occur when an individual accepts influence because the induced behavior is congruent with his value system." (p.457) In an internalization process, individuals initially accept and rely on information from an authority because the authority is perceived as credible and because the authority is using his expertise to propose a course of action which appears desirable to the individual, i.e., a course of action which is likely to lead to results consistent with those valued by the individual. However, the internalization process is not complete until the individual has incorporated the information from the authority into his own belief system and has modified that information to fit his own unique situation. In the process of incorporating and modifying an authority's information, the individual tends to become independent of the external authority. In such a process, the expert power of the authority is diminished as the individual is able to adapt the authority's information and evaluate the consequences of following that information. This raises the question whether personality attributes such as dogmatism are related to the way individuals accept, rely on, incorporate, and modify information received from authority sources. In effect, the attempt will be to determine whether there are theoretical and empirical grounds for hypothesizing a relationship between dogmatism and the rate at which the expert power of an authority is diminished for a given individual.

The concept of dogmatism is central to the theory of belief systems developed by Milton Rokeach (1960) in his book, The open and closed mind. The theory is primarily concerned with the organization of an individual's belief system, i.e. with the question of how an individual organizes all the beliefs which he has and accepts them as true of the world in which he lives. Rokeach proposes that all belief systems are organized along certain structural dimensions, each of which has certain attributes. The theory attempts to describe "...how the various dimensions and attributes may be tied together theoretically to produce a mind which, in its totality, can be fruitfully described as varying in the degree to which it is an open or closed mind." (1960, p.53) Rokeach uses his description of the dimensions, attributes, and relations among each to arrive at a basic definition of the extent to which a person's belief system is open or closed. I will here be concerned with this basic definition which reflects the nature of the structural components of open and closed belief systems.

Rokeach suggests that "...a basic characteristic that defines the extent to which a person's system is open or closed ...(is)... the extent to which the person can receive, evaluate, and act on relevant information received from the outside on its own intrinsic merits, unencumbered by irrelevant factors in the situation arising from within the person or from the outside." (1960, p.57) Rokeach gives some examples of such irrelevant factors which can interfere with a person's ability to process information in such an unencumbered fashion. Various personal needs -- for power, self-aggrandizement, to allay anxiety -- are offered by Rokeach (1960) as examples of such factors which arise from within the individual. Rokeach also suggests that examples of factors which arise from the outside are primarily "...the pressures of reward and punishment arising from external authority; for example, as exerted by parents, peers, other authority figures, reference groups, social and institutional norms, and cultural norms." (1960, p.57)

Rokeach's concept of dogmatism is operationalized by a scale designed to measure the open or closed nature of a person's belief system. The dogmatism scale, in it's final version (Form E), consists of forty statements. Subjects (Ss) respond to each item by indicating how strongly they agree or disagree with the statement. A high score on the scale (strong agreement with the statements) indicates a high degree of dogmatism or, equivalently, a closed belief system. A low score on the dogmatism scale (strong disagreement) indicates a low degree of dogmatism or, equivalently, an open belief system. The dogmatism scale went through various stages of development intended to increase its reliability and validity, i.e., to determine whether persons would respond to one half of the scale in the same way in which they responded to the other half (split-half reliability) and to determine whether the scale actually measured what it was intended to measure (validity). The full discussion of the development of the dogmatism scale appears in The open and closed mind and will not be repeated here. In the next chapter on methodology I will discuss how the reliability of the form of the dogmatism scale which I used affected the design of my analysis -- or, more properly, re-design. The following review of empirical research will serve to demonstrate the validity of the measure. In the remainder of this chapter I will limit myself to (1) a discussion of how the concept of dogmatism was used in studies which are related to the objectives of this work and (2) a description of the findings and conclusions of such studies.

Rokeach's major theoretical hypothesis is that dogmatism is negatively related to a capacity to "...receive, evaluate, and act on relevant information received from the outside on its own merits, unencumbered by irrelevant factors in the situation arising from within the person or from the outside." (1960, p.57) That is, a high level of dogmatism is associated with a low capacity to process information in such a fashion while a low level of dogmatism is associated with a high capacity to process information in such a fashion. This negative relationship is demonstrated in a number of studies. These studies attempt to account for the occurence of the negative relationship between dogmatism and a capacity to process information by focusing on certain internal and external factors. The intent of such studies is to show that the differential capacity of open and closed minded persons to process information is explained by differences in the way in which certain internal and external factors affect the individual's capacity to process information. Some examples of such internal (internal to the individual) and external (outside the individual) have already been given above. In this review I will consider, in turn, other internal and external factors which produce different effects on the capacity of open and closed minded persons to process information. I will also consider the joint effects of both internal and external factors.

The major internal factor which has been found to account for differences between open and closed minded persons in their capacity to process information is their ability to use a particular style of thinking in problem-solving situations. Rokeach describes two distinct styles of thought -- analysis and systhesis -- as "...phases of mental activity in problem-solving." (1960, p.174) The analysis phase of problem-solving consists of the processes by which specific beliefs, currently held by the individual, are modified or overcome and replaced with new and different beliefs. The synthesis phase consists of the processes by which new beliefs are integrated and a new belief system is formed. Analysis, therefore, refers to the modification or replacement of only single beliefs while synthesis refers to the modification or replacement of entire belief systems. According to Rokeach (1960), open and closed minded individuals differ in the synthesis phase but not in the analysis phase. The open minded individual is more able to integrate new beliefs into a new belief system than is the closed minded individual who experiences difficulty in the synthesis phase of problem-solving activities.

Milton Rokeach and others conducted a series of original experiments which were designed to test the postulated differences about the respective abilities of open and closed minded persons in the synthesis phase of problem-solving. This series of experiments is reported in The open and closed mind.

In their attempt to characterize the mental process of open and closed minded persons, Rokeach et. al. found it necessary to make a distinction between rigid and dogmatic thinking. The distinction was necessary because the two concepts to appear to mean about the same thing and, furthermore, a well-established set of literature had already grown up around the concept of rigidity. Rokeach et. al. believe that an important distinction between the two concepts is that they each refer to "discriminably different psychological processes." These two processes are those which were refered to above as analysis and synthesis. The authors state that rigidity "... refers to the resistance to change of single beliefs (or sets of habits), and ... (dogmatism)... refers to the resistance to change of systems of beliefs." (1960, p.183)

The authors developed a basic experimental situation (with a number of variations) which was designed to test hypothesized relationships between rigidity, dogmatism, and the capacity to engage in both the analysis and synthesis phases of mental activity in a problem-solving situation. The experimental situation is known as the Denny Doodlebug (DD) Problem after its originator, Ray Denny. The nature of the DD Problem is such that it presents the subject (S) with "... a minature cosmology, a minature belief system that will be at odds with the one we employ in everyday life." (1960, p.171) The new belief system in the DD Problem is a set of three interrelated beliefs about the possible movements of an imaginary bug (Joe Doodlebug) whose task is to reach food which has been placed at some specified location (in one version of the experimental situation, the food is placed three feet directly west of the bug's present location). The problem for the imaginary bug is how to reach the food given certain restrictions on his movements: (1) he can only jump in four directions -- north, south, east, and west; (2) he cannot turn around; and (3) once he starts in any direction, he must continue to jump four times in that direction before he can change direction. Subjects are told that the bug has solved his problem and the S is told what the solution to Joe's problem is. The problem for the S is to reconstruct the reasoning which led the imaginary bug to the correct solution. In effect, the S is asked to explain to the experimenter why the given solution is the correct one.

In order to solve this secondary problem of reconstructing the logic which led to the correct solution, Ss must do two things. First, the S must overcome three common everyday beliefs and replace those beliefs with new ones from the minature cosmology of Joe Doodlebug -- that is, the S must engage in analytic thinking. The three beliefs which the S must overcome and replace with new ones are:

> 1. The facing belief. In everyday life we have to face the food we are about to eat. But Joe does not have to face the food in order to eat it. He can land on top of it.
>
> 2. The direction belief. In everyday life we can change direction at will. But Joe is not able to do so because he is forever trapped facing north. Thus, the only way Joe can change direction is by jumping sideways and backwards.
>
> 3. The movement belief. When we wish to change direction in everyday life there is nothing to stop us from doing so immediately. But Joe's freedom of movement is restricted by the fact once he moves in a particular direction -- north, south, east or west -- he has to continue four times in this direction before he can change it. Thus when Joe stops to survey the situation at the moment his master places the food down three feet west of him, he may or may not necessarily be a free agent. He may have stopped in the middle of a sequence of jumps rather than at the end of a sequence. Many subjects have difficulty because they assume that Joe is at the end rather than possibly in the middle of a sequence (when the latter is true). (1960, pp.172-173)

The second task which Ss in the DD Problem must complete is to "...somehow integrate these new beliefs into the problem situation." (1960, p.172) The integration or organization of the three new beliefs into a new belief system (that of Joe Dodlebug) allows an S to state the solution to the problem. This second task represents the systhesis phase of the problem.

The DD Problem provides a number of separate measures of the ability of individuals to perform in both the analysis and synthesis phases of problem-solving situations. The administration procedure permitted the investigators to obtain five separate measures of the individual's ability to analyze:

1. Time taken to overcome one belief.
2. Time taken to overcome two beliefs.

> 3. Time taken to overcome all three beliefs.
> 4. Number of beliefs overcome without outside help by the time the first belief is given as a hint (5 or 10 minutes in different experiments).
> 5. Number of beliefs overcome by the time the second belief is given as a hint (10 or 15 minutes in different experiments). (1960, p.175)

The investigators note that there is a practical difficulty in using the DD Problem to determine the rate at which individuals are able to synthesize new beliefs. This practical difficulty arose because it was not possible "...to pinpoint precisely where in the problem solving activity analysis ends and synthesis beings." (1960, p.175) Since it was impossible to determine exactly when an individual entered the synthesis phase, it was also impossible to determine exactly how quickly an individual could integrate the new beliefs into a new belief system. However, the investigators assumed that the analysis and synthesis phases did overlap each other and that some synthesizing activity would probably begin as soon as the first belief was overcome (either by the S himself or with the hints from the experimenter). It was therefore possible to arrive at three separate measures of the capacity to synthesize:

> 1. Time taken to solve the problem after the first belief is overcome.
> 2. Time taken to solve the problem after the second belief is overcome.
> 3. Time taken to solve the problem after all three beliefs are overcome. (1960, p.176)

Rokeach (1960) reports findings which were obtained from the administration of the basic experimental situation of the DD Problem (as described above) and from the administration of three variations on the basic situation. I will here be concerned only with findings from the basic experimental situation which bears most directly on the objectives of this study.

Rokeach (1960) reports on two studies which were made with the basic experimental situation of the DD Problem. In one study, Form C (an earlier form) of the Dogmatism Scale and the twenty-two item Gough-Sanford Rigidity Scale were administered to 109 college students who were enrolled in an introductory psychology course. Subjects were selected for individual experimentation with the DD Problem in such a way as to increase the sensitivity of the experiment. This selection procedure was followed in order to increase the chances that an actual relationship between dogmatism, rigidity and the measures of analysis and synthesis would be demonstrated in the experimental findings. Accordingly, sixty subjects who scored at the extremes on the measures of dogmatism and/or rigidity were matched in such a way as to constitute the following four experimental groups:

Experimental Groups in DD Problem: Study I[a]

	Open Group	Closed Group	Total
Rigid Group	15	15	30
Nonrigid Group	15	15	30
Totals	30	30	60

[a] Numbers = number of Ss

The following hypotheses were tested:

A. Concerning analysis:
   1. Persons high in rigidity should have greater difficulty in the analytic phase of problem-solving than persons low in rigidity,
   2. but persons open and closed in their belief systems, as measured by the Dogmatism Scale, should not differ from each other in this respect.

> B. Concerning synthesis:
>   1. Persons with closed systems should have a greater difficulty in the synthesizing phase of problem-solving than persons with open systems,
>   2. but persons high and low in rigidity should not differ from each other in this respect. (1960, p.185)

In general, the results of this study substantiated the hypotheses although better support was observed for the hypotheses concerning analysis than for the hypotheses concerning synthesis. While it was not possible to base statistical tests of hypotheses concerning analysis on the first three measures of analysis[1], tests were performed on the measures of number of beliefs overcome by the subject within the first ten minutes of the experiment and within the first fifteen minutes of the experiment. The results of these latter two tests confirmed the above hypotheses concerning analysis. As a group, persons high in rigidity overcame fewer beliefs within the first ten minutes and within the first fifteen minutes than did persons low in rigidity ($p <.05$ for both tests). There was, therefore, good support for the hypothesis that rigid persons are less able to analyze relevant information in this problem-solving situation than are nonrigid persons. As hypothesized, open and closed minded persons did not differ in ability to analyze in the DD Problem as indicated by the latter two measures. Statistical tests were also performed on all three measures of the ability to synthesize. As hypothesized, rigid and nonrigid persons did not differ in ability to synthesize in the DD Problem as indicated by the three measures of synthesis.

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[1] This was true because the authors stated that "...certain statistical assumptions that are prerequisite to such tests are not met; the distribution of scores are extremely skewed and there are a large number of tied scores because many subjects did not overcome the beliefs by themselves." (1960, p.189)

There was only partial support for the hypothesis that closed minded persons are less able to synthesize than are open minded persons. Only on one of the three measures of synthesis -- number of minutes taken to solve the problem after the second belief was overcome -- did closed minded persons take longer to solve the problem than did open minded persons. There was, therefore, only partial support for the hypothesis that closed minded persons are less able to synthesize relevant information in this problem-solving situation than are open minded persons. Rokeach suggests that the hypothesis was not consistently supported by all tests because the difference between the dogmatism scores of open and closed minded persons was not great enough. In addition, Rokeach concludes that dogmatic and rigid thinking are discriminately different but not necessarily independent processes. Even though there was a positive correlation of .45 between dogmatism and rigidity scores in the experimental population, Rokeach notes that the results of the experiment support the point of view that dogmatism and rigidity are different psychological dimensions of an individual's personality. Rokeach also states that level of intelligence does not account for the differences (or lack of them) between the performance of open and closed minded persons in the DD Problem. The observed correlation between intelligence (as measured by the American Council on Education Test) and scores on the Dogmatism Scale was -.02 for the experimental population of his study.

A second study which Rokeach (1960) reports in The open and closed mind also employed the basic experimental situation of the DD Problem (without variations). In this second study, Form E of the Dogmatism

Scale was administered to 249 college Sophomores. From the group of 249 students, the thirty Ss who scored highest and the thirty Ss who scored lowest on the Dogmatism Scale were selected for individual experimentation with the DD Problem. As a group, the open and closed minded Ss in this study were more extreme in their scores on the Dogmatism Scale although specific mean scores were not reported for any of the experimental groups in either study. In this study, Rokeach was also concerned with testing the role of memory on the synthesizing process. Rokeach believed that "the integration of new beliefs into a new system can proceed smoothly only if the thinker can keep in mind simultaneously all the new beliefs to be synthesized. If there is any malfunctioning of memory, for whatever reason, it should slow down the synthesizing process." (1960, p.176) In order to test for the effects of memory, one-half of the open minded and one-half of the closed minded group were randomly assigned to experimental and control groups. The following administration procedure was used:

> The three new beliefs (the facing, direction, and movement beliefs) are typed on separate cards. As the subject discovers one or more of these by himself the appropriate card is placed before him. If the subject fails to discover the new beliefs for himself, the cards containing the beliefs are placed before him at specified time intervals in the form of hints. The experimental group, composed equally of closed and open subgroups, is allowed to keep the belief cards in front of them throughout the experiment. We will call this the "visual field" condition. The control group, also composed equally of closed and open subgroups, is also shown the belief cards in the same way. But each card is taken away immediately after its contents are read. We will call this the "memory field" condition. (1960, pp. 197-198)

In this study it was found that, although neither dogmatism nor memory was related to the ability to analyze, both dogmatism and memory were related to the ability to synthesize relevant information in the DD Problem. Contrary to the results of the previous study, there was complete support for the hypothesis that closed minded persons are less able to synthesize than are open minded persons. Closed minded persons took longer to solve the problem than did open minded persons on all three measures of the ability to synthesis ($p <.01$ on all three tests). The role of memory also had a significant effect on the ability to synthesize. However, there was only partial support for the hypothesis that Ss in the "visual field" condition would be more able to synthesis than would Ss in the "memory field" condition. Only on one of the three measures of synthesis -- the number of minutes taken to solve the problem after the first belief was overcome -- did individuals who had to rely on memory take significantly longer to solve the problem than those who were allowed to keep the specific belief in front of them. Rokeach also hypothesized that "... persons with relatively open systems can form new systems more easily than persons with relatively closed system (sic) because they are somehow better able to remember the separate elements that are to be integrated into the new system." (1960, p.206) The greater capacity of open minded persons to remember those beliefs which they overcame in the analysis phase of the problem was tested by having Ss recall each of the three beliefs. This incidental recall was tested ten minutes after the end of the experiment and one week after the end of the experiment. On both tests, open minded persons were superior to closed minded persons on the amount of time taken to recall the three beliefs. Rokeach also suggests that, since closed minded persons tend to have more anxiety than open minded persons, closed minded persons find the DD problem more threatening than do open minded persons and that, therefore, anxiety produced by the experimental situation may also account for the observed differences. However, this hypothesis about the effects of level of anxiety was not specifically tested by Rokeach with the DD Problem.

Samuel Fillenbaum and Arnold Jackman (1961), in an article entitled "Dogmatism and anxiety in relation to problem solving : an extension of Rokeach's results", present direct evidence on the hypothesized relation between anxiety and performance in the DD Problem. The Fillenbaum and Jackman study is also significant because (1) it attempts to demonstrate the relationship between dogmatism and performance in the DD Problem over the whole range of scores on dogmatism rather than just for extreme groups, and (2) the study offers an alternative explanation to account for the differences between open and closed minded persons on the measure of time taken to solve the problem after the third inappropriate belief is overcome by the subject.

Fillenbaum and Jackman administered Form E of the Dogmatism Scale to seventy-three college students who were enrolled in an introductory psychology class. Fourty-nine Ss were selected for individual experimentation with the basic form of the DD Problem. Subjects were selected so that individual Dogmatism scores covered the entire observed range of scores. A generalized anxiety scale was also administered to forty-two of the fourty-nine students who participated in the DD experiment.[1] The authors observed a definite relationship between Dogmatism and the measure of anxiety. The observed correlation coefficient (r) was .49 (p <.01). This relationship observed by Fillenbaum and Jackman is consistent with findings reported by Rokeach (1960) for comparable samples.[1]

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[1] The authors do not say why the anxiety scale was not administered to all 49 Ss who participated in the DD experiment.

In the Fillenbaum and Jackman study, anxiety scores did not account for a negative relationship between level of dogmatism and the ability to synthesize in the DD problem. The authors replicated Rokeach's findings for extreme scores on the Dogmatism Scale and time taken to solve the DD Problem after the third inappropriate belief was overcome. Fillenbaum and Jackman also demonstrated that the hypothesized relation between dogmatism and the ability to synthesize (as indicated by the above measure) held over the entire range of Dogmatism scores (r = .41; p <.01). The authors also computed a partial correlation coefficient to separate out the effects of anxiety on the measure of synthesis in order to demonstrate that the effects of dogmatism were independent of the effects of a generalized anxiety variable.

The study by Fillenbaum and Jackman is also interesting because they present an alternative explanation to account for the finding that closed minded persons take longer to solve the DD Problem after overcoming the third inappropriate belief than do open minded persons.

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[1] Rokeach reports r's ranging from .44 to .64 for four groups of college students. All correlation coefficients reported by Rokeach were statistically significant (p = .01). (1960, p.348) Fillenbaum and Jackman note that their measure of generalized anxiety was somewhat different from the measure used by Rokeach although both measures were based on items derived from the Minnesota Multiphasic Personality Inventory.

Rokeach (1960) interpretes the three measures of time to solution -- after the first, second, and third beliefs are overcome -- as measures of the ability to synthesize relevant information. However, Fillenbaum and Jackman note that:

> most of the differences between subjects in total time to solution are clearly attributable to differences in time to solution after the last (the third) of the inappropriate beliefs has been broken, either through the subject's own action, or, much more commonly, as a result of being given the third of the hints. (1961, p.214)

Fillenbaum and Jackman believe that since this is true an alternative explanation for the observed differences may simply be that the third belief (the movement belief) is more difficult to overcome and to use in the solution of the problem. Stated more systematically, this alternative explanation would be that open and closed minded persons do not necessarily differ in any overall ability to synthesize relevant information but rather differ in the ability to use given information which they do not come to by themselves.

A study by Kleck and Wheaton (1967) also hears on the important question of the differential ability of open and closed minded persons to integrate or synthesize information which is at odds with or contradicts the person's own beliefs. Kleck and Wheaton obtained Dogmatism Scores on seventy-two juniors in high school and confronted the students with two sets of information -- one of which contained information which was consistent with the S's own opinion on an issue and one of which contained information which was inconsistent with the S's opinion. Students indicated their own position on the issue of whether the minimum driving age should remain at sixteen or be raised to eighteen. Students were then asked to read and evaluate two articles on the issue. The articles either contained information supporting the status quo (16 years), or raising the minimum age level to eighteen. Students were tested two weeks later on their recall of information in both of the two articles. It was found that closed minded persons recall less information which is inconsistent with their own beliefs than do open minded persons ($p <.01$). Kleck and Wheaton (1967) believe that "this supports Rokeach's notion that the closed-minded person is less able to integrate new beliefs into his cognitive system in that what is not recalled cannot be integrated." (p.251) However, the authors caution that "... it is possible that the decreased recall was a function of inattention to dissonant information while reading, rather than a memory loss experienced over time." (p.251) If this latter alternative explanation is correct it would mean that open and closed minded persons do not necessarily differ in the ability to synthesize inconsistent information but rather in the attention which they pay to such information.

The studies by Rokeach (1960) and Fillenbaum and Jackman (1961) support the hypothesis that closed minded persons are less able to synthesize relevant information in a problem-solving situation than are open minded persons. The authors demonstrated this differential ability of open and closed minded persons to synthesize relevant information in the Denny Doodlebug Problem. In the DD Problem, the "relevant information" is a set of beliefs which is at odds with the common everyday beliefs of subjects. The Kleck and Wheaton study is important because it demonstrates that this differential ability to synthesis may apply to social situations. In the Kleck and Wheaton study, the "relevant information" is a set of statements which do not support the subject's position on the issue of whether the minimum driving age should remain at sixteen or be raised to eighteen. Kleck and Wheaton refer to such statements as "inconsistent information" -- that is, information which is inconsistent with or contradicts the subject's own beliefs which support his own position on the issue. A study which was conducted by Fredrick Powell (1966) suggests that the differential ability of open and closed minded persons to synthesize information may apply to a large number of social issues on which people take different positions. In order to understand the Powell study, it is first important to note that an issue is anything about which people disagree -- that is, take different positions on the issue. Secondly, at any given position on an issue, individuals presumably have certain beliefs which are acceptable because the beliefs support their position. Thirdly, for any given position on an issue, individuals may be confronted with beliefs which are unacceptable or objectionable because such beliefs do not support their own position on an issue. Objectionable beliefs are therefore those which support some position other than that taken by the subject.

Fredrick Powell (1966) investigated the relationship between levels of dogmatism and what has been termed latitudes of acceptance and rejection. Powell defines these terms in the following way:

> ... an individual's attitude or stand on a given issue may be defined as his latitude of acceptance for that issue, that is, the range of positions on that issue which are acceptable to him, including the one position "most acceptable." This latitude of acceptance is complemented by a latitude of rejection, consisting of positions on the issue which the individual finds objectionable. (1966, p.453)

Powell (1966) conducted three separate studies in which junior and senior college students completed a short-form of the Dogmatism Scale and an instrument which was designed to determine (1) the extremity of their stand on a social issue, (2) the breadth of their latitude of acceptance, (3) the breadth of their latitude of rejection, and (4) the breadth of their latitude of noncommitment, i.e., those positions on an issue which are neither acceptable nor objectionable to the subject. The short-form version of the Dogmatism Scale had been developed by Troldahl and Powell (1965) and correlates quite highly with Form E of the scale. One of three different social issues which dealt with alcohol, the 1964 Presidential election, and the Church was administered in each study. A typical instrument consisted of a series of attitude statements which represented different stands on the issue and which ranged from extremely favorable to extremely unfavorable with respect to the issue. The following administration procedure was used:

> Subjects indicated, from the series of statements presented them, the one statement "most acceptable," other statements "acceptable," that statement "most objectionable," and any other statements "objectionable" to them. These indications were used to determine each subject's latitudes of acceptance (statements marked most acceptable and acceptable), rejection (statements labeled most objectionable and objectionable), and noncommitment (statements not indicated as either acceptable or objectionable). In addition, the relative extremity (irrespective of direction) of the statement selected as most acceptable (presumably the subject's own position or stand) was noted. (1968, p. 454)

Powell hypothesized that closed minded individuals would (1) take more extreme stands on issues, (2) have a narrower latitude of acceptance, (3) have a broader latitude of rejection, and (4) have a narrower latitude of noncommitment than would open minded individuals. Powell found complete support in all three studies for hypotheses 1 and 3 and partial support (in two out of three studies) for hypothesis 4. No support was found for the hypothesis that closed minded persons have a narrower latitude of acceptance for positions on social issues than do open minded persons. Powell's study therefore indicates that because of their degree of dogmatism and because of the extremity of the position taken, closed minded persons can be confronted with more information which is inconsistent with or contradicts their own beliefs on social issues than can open minded persons. I have said that closed minded persons can be confronted in social situations with such information which they find difficult to synthesize but what happens when they actually are confronted with such information? This question is partially answered by some studies which have investigated the relationship between dogmatism and learning in a class-room situation.

There is no evidence that in general closed minded persons are less able to learn in a class-room situation than are open minded persons. Although learning undoubtedly involves both analysis and synthesis phases of mental activity, the differential ability of open and closed minded persons to synthesize relevant information does not always affect the amount of learning which takes place in a class room for open and closed minded students. Frank Costin (1965) notes such an inconsistent effect of dogmatism on learning in the contradictory findings of studies conducted by Howard Ehrlich (1961) and C. M. Christensen (1963).

In the Ehrlich study (1961), Form E of the Dogmatism Scale, a test of intellectual ability, and a pre- and post course test of knowledge or sociological knowledge were administered to college students who were enrolled in an introductory sociology class. Ehrlich found that there was a significant negative partial correltation between dogmatism and achievement in the sociology class when ability and initial sociology test scores were held constant (partial r = -.43; p. <.01). Christensen's study (1963) was performed with college students who were enrolled in an introductory psychology class. Christensen found that closed minded persons did not have lower levels of achievement over material in the psychology class than did open minded persons.

Frank Costin (1965) adopted, for use with psychology students, the same procedures used by Ehrlich on sociology students. In the Costin study, students enrolled in four sections of an introductory psychology class completed (at different times throughout the semester) Form E of the Dogmatism Scale, a pre- and postcourse objective test of course material, and a test of intellectual ability. In contrast to Ehrlich's findings for sociology students, Costin did not find a significant partial correlation between dogmatism and achievement in an introductory psychology class when ability and initial psychology test scores were held constant. Costin concludes:

> These contradictory findings may ... reflect important differences in the kinds of knowledge examined in the sociology test as compared with the psychological tests. One such difference could be that Ehrlich's test measured information which concentrated on social issues and similar kinds of controversial relationships, whereas the psychological tests measured more varied and general kinds of information related to human behavior. Second, the dogmatism scale itself may emphasize a particular kind of dogmatism, one which is especially relevant to controversial social relationships and public behavior. (1965, pp.187-188)

Another major factor which has been found to account for differences between open and closed minded persons in their capacity to process information is, in a sense, external to the individual, that is, it arises primarily from outside the individual. Rokeach (1960) believes that open and closed minded persons differ in how they perceive a source of information and that, because of the nature of these perceptions, open and closed minded individuals differ in their ability to discriminate between information received from the source and information received about the source. As I pointed out earlier in the text, Rokeach defines "any source to whom we look for information about the universe, or to check information we already possess" as an authority. (1960, p.43) Furthermore, such authorities exercise what has been called informational social influence if persons accept information from such sources as evidence about reality. I have also previously referred to the characteristics of any person who exercises influence as bases of power. In light of this, it can be shown how open and closed minded persons differ in their perceptions of an authority's bases of power. I will subsequently show how different perceptions of an authority's base of power affects an individual's ability to discriminate between information received from an authority and beliefs about the authority.

The influence which an authority can exercise over an individual hinges on that individual's perception of the authority. Open and closed minded persons differ in their perceptions of an authority. These perceptions differ in such a way that any authority's perceived base of power is different for open and closed minded persons. Rokeach describes these differences in the following way:

> By open I mean that the power of the authority rests solely upon the perception of the source's cognitive correctness, accuracy and consistency with other information, as obtained by other means--that is, from one's own cognitions, and from other information obtained from other sources. Authority which gives information in conflict with one's own cognitions will be judged unreliable and will be rejected, in order to be replaced by other authority judged

> to be more correct, accurate, or consistent. In closed authoritarian orientations to authority (sic), however, the power of the authority does not at all hinge upon the cognitive correctness but solely on the ability of authority to mete out rewards and punishments. (1961, p.235)

Individuals of course do not differ in respect to any general tendency to accept or rely on information from an authority (Rokeach, 1960; 1961). Individuals do have certain needs for cognitive clarity which lead them to rely on information received from others in order to resolve uncertainty about their present situation. However, individuals do differ in how they rely on the information which they receive from authorities. Rokeach (1961) conceives of "... opposing orientations in modes of reliance on authority, ranging from open orientations to authority at one extreme to closed orientations at the other." (pp.234-235) (Emphasis mine.) In order to be consistent with the preceeding discussion, I shall subsequently speak of an individual's perception of an authority and associated bases of power rather than of an individual's orientation to an authority.

The opposing modes of reliance on authority which characterize open and closed minded persons are also related to the ability to discriminate between information received from the authority and beliefs about the authority. Since the theoretical rationale for such a relationship is rather complex, I will quote it directly:

> It is assumed that every communication received from an external authority source contains two kinds of information. It contains information of a substantive nature and it contains information about the authority source itself. Substantive information is typically obtained from the sheer content of the message. The prestige aspects of the source are obtained from the expressive and evaluative aspects of the message. And the way in which the communication is delivered, such as tone of voice, facial expression, the social conditions under which the message is delivered,

> and so on. The more open one's orientation toward authority, the more will the two kinds of information be clearly distinguished from each other and the more will each be evaluated and responded to on their respective merits. That is, the person has freedom to choose or not to choose to be influenced in a direction desired by the source, depending on his own assessment of both sets of information. However, the more closed one's orientation toward authority the more difficult it will be, by virtue of the authority's effective capability to mete out reward and punishment, to discriminate the two qualitatively different kinds of information, and consequently, to assess and act on them on their respective merits. What the external authority says is true about the world will become cognitively indiscriminable from what the external authority wants us to believe is true, and wants us to do about it. The person in such a closed state of mind will thus be forced to evaluate and to act in ways desired by the source rather than in terms of what Kohler (1938) has called "inner requiredness" and what Katz and Stotland (1959) have called "appropriateness." (Rokeach, 1960, pp.235-236)

There is therefore adequate theoretical basis in Rokeach's writings (1960; 1961) for assuming that open and closed minded persons differ in their perceptions of authorities and associated bases of power. Open minded persons perceive an authority as simply a source of what may or may not be valid information which is subject to testing by the individual. On the other hand, closed minded persons perceive an authority as a source whose information is accepted as valid because of authority's control of reward and punishments over the individual. Furthermore, these differences in perception of an authority account for differences in the way in which open and closed minded persons rely on information received from an authority. Although both open and closed minded persons initially accept and rely on information from an authority, open minded persons are more active than closed minded persons in testing the appropriateness of the information for their present situation and therefore open minded persons are less passive in their reliance on authority than are closed minded persons.

Such differences in the modes of reliance or authority which are characteristic of open and closed minded persons are reflected in the differing ability of open and closed minded persons to discriminate between information received from an authority and beliefs about the authority.

The differential capacity* of open and closed minded persons to discriminate between information received from an authority and beliefs about the authority has been tested by Fredric Powell (1962) in an article entitled "Open- and closed-mindedness and the ability to differentiate source and message." Specifically, Powell hypothesized that open minded persons have a greater capacity to distinguish information from source of information than do closed minded persons, and that open minded persons evaluate information and source of information independently (each on its own merits) while closed minded persons do not. Powell administered Form E of the Dogmatism Scale to seventy-six persons who were selected from the general population of Lansing, Michigan by means of a modified quota sampling procedure. Subjects also indicated on fourteen semantic differential scales their judgments of (1) the two major Presidential candidates in the 1960 election, and of (2) statements which the candidates had made in the course of the Presidential campaign. For each individual, Powell computed a measure of difference or distance betwen judgments of the source and judgments of the source's statements. Powell found that there was a significantly greater difference between the judgment of the source and the judgment of the source's statements for open minded persons than there was for closed minded persons. Powell concluded that "... open-minded individuals are better able to distinguish between and evaluate independently the content of the message and the source of the message than are closed individuals." (1962, p.63) Powell suggested that the relative inability of closed minded persons to distinguish between and evaluate independently a source and a message from that source may be due to a comparable inability to tolerate incongruity or inconsistency between perceptions of source and message. Rokeach however presents an alternative explanation for this phenomenon:

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* The reader will note that I have used the terms "ability" and "capacity" interchangeably -- as they are used in the literature on dogmatism.

> If a person feels strongly threatened or anxious in a given situation, he should above all be motivated to act so that the threat is reduced and the anxiety allayed. It is precisely because he is so motivated that the relatively closed person becomes highly attuned to irrelevant internal and external pressures and, accordingly, unable to evaluate information independent of source. Thus, primitive beliefs to the effect that the world is threatening is the very basis of the inability to distinguish information from source. (1960, p.62)

Whatever the underlying basis for this finding, the differential capacity of open and closed minded persons to discriminate between beliefs about an authority and information from an authority has important consequences for other behavior of open and closed minded persons.

Rokeach (1960) suggests that "the inability to distinguish the dual aspects of communications should in time lead not only to a stronger acceptance of the belief system but also to a stronger rejection of all disbelief subsystems." (p.62) A persons stronger acceptance of his belief system can be manifested as tendencies to take extreme stands on issues, to rely heavily on known persons for information, and to favorably evaluate sources of information regardless of the validity of the source's information. A person's stronger rejection of all his disbelief subsystems can be manifested as tendencies to exaggerate the differences between what he believes is true (his belief system) and what he believes is false (his disbelief subsystem), to refuse to accept as valid information which does not come from a known authority, and to refuse to accept as valid information which is inconsistent with other information obtained from a known authority. There is some evidence to indicate that such consequences do follow from the relative inability of closed minded persons to distinguish between the dual aspects of communications. For example, Rokeach (1960) has shown that open minded persons report that their development was influenced by more persons outside of their immediate nuclear family than do closed minded persons. Rokeach believes that this finding may indicate that "the development of closed belief systems may be a function of breadth or narrowness of identification with others which, in turn may be a function of the extent to which ambivalent feelings toward parents are permitted within the family atmosphere." (1960, p.361) In other words, if parents do not tolerate a child's ambivalent feelings toward them, then such parents may be perceived more powerful (and threatening). If such perceptions of parents develop, then the child is presumably less able to identify with others outside the immediate family who lack direct control over rewards and punishments for the child. This sort of development could lead to a tendency to rely heavily on those few authorities with whom the child is able to identify and to reject those with whom he is not able to identify. Such a developmental process could also account for a tendency to perceive few differences between those positive authorities who are favorably evaluated.

The inability to discriminate between substantive information from a source and beliefs about the source may also lead to a tendency to rely not on the cognitive correctness of the source's information but on the prestige or status of the source of information. Robert Vidulich and Ivan Kaiman (1961) have shown in a paper entitled "The effects of information source status and dogmatism upon conformity behavior" that closed minded persons are more influenced by a person of high social status than are open minded persons. Vidulich and Kaiman tested the effects of dogmatism and status of an information source on conformity behavior in an autokinetic effect experiment.* Vidulich and Kaiman selected sixty persons who scored extremely high or extremely low on Form E of the Dogmatism Scale for individual participation in the autokinetic effect experiment. All subjects were females who were drawn from a pool of 307 undergraduates who were enrolled in an introductory psychology course. The following experimental procedure was used:

> Each subject privately judged the directional movement of the light for 30 exposures and then made an additional 30 judgments following reports of a confederate of the experimenter. For one-half of each group, the confederate was presented as a college professor (high status); he was introduced as a high school student for the low status groups. During the second experimental phase, the con-

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* In an autokinetic effect experiment, Ss are asked to judge the distance and/or the direction of the movement of a pin-point of light in a darkened room. The autokinetic effect is the appearance of movement of the stationary pin-point of light. In the Vidulich and Kaiman experiment, Ss judged the direction of the autokinetic movement, i.e., whether it appeared to move left or right.

> federate made responses which were 80% in the least-judged direction of the subject during the private judging experimental phase. (1961, pp.641-642)

Vidulich and Kaiman (1961) computed two measures of the S's degree of conformity to the judgments of the information source (confederate). One measure was a difference score which was calculated by subtracting the number of times the S made her least frequent response in the first phase of the experiment from the number of times the S made the same kind of response in the second phase of the experiment. This measure therefore showed whether the subject, hearing the announced judgments of the information source, would make her least preferred response more often than she did when she was not receiving information from the confederate. A second measure was simply the number of times the S agreed with the announced judgments of the confederate in the second phase of the experiment. Vidulich and Kaiman found that on both measures of conformity, closed minded persons were more likely to be influenced by sources of high status than were open minded persons. The authors concluded that:

> With regard to the postulated inability of the closed person to discriminate a message from its source, the present findings are seen as suggestive rather than definitive. What is required in future studies of this hypothesis is the use of an experimental situation in which it is possible for the subject to evaluate independently the information received about reality from a source and the source itself. A modified Asch-type procedure, such as that used by Crutchfield (1955), would appear to be appropriate.* (1961, p.641)

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* The major difference between the experimental procedure used by Vidulich and Kaiman and that which they suggest as appropriate for a test of the discrimination hypothesis is that, in the procedure used by Crutchfield, the stimulus is less ambiguous than is the pin-point of light in the general procedure used by Vidulich and Kaiman.

The advantage of such a modified procedure would be that Ss would be judging less ambiguous stimuli and therefore would have other more objective information which could be used to evaluate the information received from the source than is available to the S in the Vidulich and Kaiman experiment.

On the basis of the preceding discussion, it is now possible to consider the joint effects which internal and external factors have on the decision making behavior of open and closed minded persons. Here, the major internal factor is the ability to analyze and synthesize information in problem-solving situations. As I have shown, closed minded persons are less able to synthesize relevant information than are open minded persons, i.e., are less able to integrate new information into a new belief system. However, open and closed minded persons do not differ in the ability to analyze. The major external factor is the ability to discriminate between substantive information from an authority and beliefs about the authority. As I have shown, closed minded persons are less able to distinguish between and evaluate independently information from an authority and beliefs about the authority than are open minded persons. Furthermore, because open and closed minded persons differ in their perception of an authority and the authority's bases of power, open and closed minded persons also differ in how they rely on authorities in problem-solving situations. Although both open and closed minded persons may accept information from some authority, the open minded person -- because he is able to discriminate between his beliefs about the source and the source's information -- is more likely to test the source's information against all available information than is the closed minded person. In this final section of the review of related literature, I will be concerned with the question of whether there is an interaction of these internal and external factors which has a joint effect on the decision making behavior of open and closed minded persons.

There is some support for two such interaction hypotheses. The first is that, although open and closed minded persons do not differ in their ability to analyze, closed minded persons will perform better in problem-solving situations which only require analysis if they receive correct information from an authority than will open minded persons who try to test the authority's information or try to reconcile the authority's information with other information which they have available to them. Such "other" information would include their perceptions of the problem situation and their own hypotheses about the correct solution. A second interaction hypothesis is that since the synthesis phase of problem-solving requires the individual to integrate all available information, closed minded persons who simply rely on the information from an authority will perform more poorly in the synthesis phase than they would otherwise. I have said that there is some support for the above hypotheses. The study which I will review below bears only indirectly on these hypotheses but it does suggest that the above hypotheses are valid.

Frank Restle, Martha Andrews, and Milton Rokeach (1964) in a study entitled "Differences between open- and closed-minded subjects on learning-set and oddity problems" attempted to determine whether open and closed minded persons do adopt opposing modes of reliance on authorities. The authors tested for such differences between open-

and closed-minded persons in what is called learning-set and oddity problem-solving situations. The nature of these situations is such that the findings of the authors suggest the above interaction hypotheses.

Restle, Andrews, and Rokeach (1964) selected persons who had scored extremely high and extremely low on the Dogmatism Scale for individual experimentation with the learning-set, reversal learning-set and oddities problems. The subjects were college students who were enrolled in introductory psychology classes. The learning-set (LS) and reversal learning-set (RLS) procedures "constitute a problem in which the subject must learn to depend upon a sequence of reinforcements which are capricious and unpredictable. In social-psychological terms these experimental procedures call forth blind dependence upon authority." (1964, p.649) In the LS procedure, Ss completed five three-trial problems. In each problem, Ss were presented, on each trial, with one pair of forms in three different arrangements (for example, AAB, BBA, ABB). The S was instructed to choose either the left or the right letter (not the middle letter which was only an irrelevant cue). The experimenter decided ahead of time whether the A or the B would be the correct answer and then consistently rewarded that response throughout the three-trial problem. The solution for the S of course is to simply make the response which the experimenter indicated was correct on the preceding trial and not to pay any attention to the position of the letters. The following procedures were used for the reversal learning-set and oddities procedures.

> RLS. Following LS training with no break or comment, the subject proceeded to RLS training. Ten six-trial problems were given, each using a single pair of forms. Within a problem one form was designated as correct and reinforced until a reversal trial, randomly chosen anywhere from Trial 2 to Trial 5. From the reversal trial to the end of the problem, the form which originally was wrong was consistently reinforced. Again, three forms appeared on each card and the middle one was a source of irrelevant cues.
>
> Oddities. Fifteen different pairs of forms were used, each for a consecutive block of five trials. The cards were of the same type as those used in LS and RLS. Again, the subject was to choose the left or right (not the middle) stimulus, and reinforcement was always given for choosing the odd stimulus. (1964, p.650)

The authors made the following hypotheses for open minded persons. Equivalent but opposing hypotheses were of course made for closed minded persons.

> Open-minded persons tend to evaluate information on the basis of its objective validity and internal consistency rather than solely on the basis of reinforcements from arbitrary authority. Open subjects should, in learning and problem solving, characteristically look for hypotheses which permit general, sensible, intrinsically satisfying, and authority-independent solutions. If this line of reasoning is valid, we should expect open-minded subjects to perform more efficiently than closed-minded subjects in solving problems which involve a principle like oddities. Conversely we should expect open-minded subjects to perform more poorly on LS and RLS problems since in such problems the subject is looking for principles and does not anticipate that the correctness of solution hinges solely on whatever response the experimenter chooses arbitrarily to reinforce. (1964, p.649)

The authors were able to confirm their hypotheses. Some support was found for the hypothesis that closed minded persons depend passively on authority and perform better in the learning-set problem than do open minded persons (but only on the last four reversal learning problems). Complete support was found for the hypothesis that open minded persons do not simply rely on the reinforcements of the experimenter but rather seek on underlying principle, i.e., open minded persons made fewer errors on the oddities problem than did closed minded persons.

In the Restle, Andrews, and Rokeach study (1964), the learning-set (LS) and reversal learning-set (RLS) problems only require the subject to use analytic thinking, i.e. to replace any beliefs which he may have about the correct response with the belief that the object last reinforced by the experimenter is the correct response. In the LS and RLS problems, the experimenter makes an arbitrary decision to reinforce one or the other object and accordingly announces on each trial whether the subject has made the correct response. This announcement by the experimenter is the only information available to the subject and closed minded persons are much more willing to rely on it than are open minded persons. Open minded persons apparently are more inclined than closed minded ones to try to find and follow other information which is independent of the experimenter. If it is valid to assume that the LS and RLS problems only require the ability to analyze, then the presence of an authority who gives correct but arbitrary information interfers more with the problem-solving ability of open minded persons than it does with the problem-solving ability of closed minded persons. There is then, in such situations, an interaction between dogmatism and correct information from an arbitrary authority which has the joint effect of making closed minded persons perform better than open minded persons in the analysis phase of problem-solving. The oddities problem however seems to require the subject to use both analytic and synthetic thinking. In the oddities problem, the subject must first use analytical thinking to learn that A is the correct response for the pattern ABB and that B is the correct response for the pattern AAB. Next, the subject must use synthetic thinking to integrate previous beliefs acquired from the above two patterns. The subject must integrate these beliefs and formulate an oddity principle so that he can recognize that C is the correct answer for the pattern CDD. If it is valid to assume that the oddities problem does require the ability to synthesize, then the presence of an authority who gives correct information which is not arbitrary but tied to the underlying principle of the problem does not interfere as much with the ability of open minded persons to solve the problem as it does with the ability of closed minded persons to solve the problem. In this situation, closed minded persons are more inclined to rely passively on the information given by the experimenter about the correct response on the preceding trial than are open minded persons who use such information to arrive at the underlying principle. There seems to be then, in such situations, an interaction between dogmatism and corrct information from a non-arbitrary authority which has the joint effect of making closed minded persons perform worse than open minded persons in the synthesis phase of problem-solving.

There are certain difficulties with this interpretation of the inter-active effect of dogmatism and information from an authority on the ability of open and closed minded persons to use analysis and synthesis in problem-solving. One problem is that it is not possible to determine whether only analysis is required in the LS and RLS problems and both analysis and synthesis are required in the oddities problem. A second and more fundamental problem is the difficulty of saying exactly what analysis is and when it takes place and the difficulty of saying exactly what synthesis is and when it takes place. These two related problems will be dealt with in the following summary of the state of the literature on expert power and dogmatism.

State of Related Literature

The preceding review of related literature discussed factors which affect an individual's decision making process. I first found it necessary to present a conceptualization of an individual's decision making process in order to identify factors which could affect such a process. An individual's decision making process was seen to consist of the temporally sequential sub-processes by which the individual receives, evaluates, and acts on information (from some source) under conditions in which the individual is in doubt about the best or most rewarding decision. The first question which I asked about such a process was whether the nature of the source of information affects the way individuals process (receive, evaluate, and act on) the information. As I have shown, certain characteristics of information sources are more relevant than other characteristics in what are called informational social influence processes. In an informational social influence process, an individual accepts information from some "other" as evidence about reality and the individual is not very concerned with the expectations which the "other" might have about his processing of that information. In such a process, the most relevant characteristics of the "other" are those which are related to his function as a source of information.

There are three major characteristics of a source of information which affect the individual's inclination to accept the source's information as evidence about reality. Collectively, these three characteristics are referred to as the expert power of the information source. If an information source is to have expert power, then he must be perceived by the individual as someone who (1) is competent to give information in a particular area; (2) is not giving the information in order to manipulate the individual; and (3) is worthy of the individual's trust that he is competent and lacks manipulative intent. The studies that I reviewed showed that if an individual perceives a source as possessing expert power, then this individual's decision making process will be affected by the information which such a source provides. The study by Croner and Willis (1961) also demonstrated that the scope of a source's expertness is restricted to the areas in which his competence is based, i.e., a source's expert power is not general but restricted to certain kinds of similar situations. Such a restriction was predicted by French and Raven (1959): "The strength of the expert power of O/P (O over P) varies with the extent of the knowledge or perception which P attributes to O within a certain area." (p.163)

French and Raven (1959) also believe that there are other limitations on the expert power of a source of information. The authors note that, although the expert power of a source "will produce (in the individual) a new cognitive structure which is initially relatively dependent" on the information source, the individual's new cognitive structure is likely to become increasingly independent of the source with the passage of time. Individuals may become increasingly independent of the source's expert power as they modify the source's information to fit their own particular situation and/or as they discover for themselves the knowledge or perception on which the source's expert power is based.

There are of course some unanswered questions in the literature on expert power. One does not know whether there are some objective characteristics of information sources which lead individuals to believe that they have expert power or whether individuals differ in a tendency to perceive a source as possessing expert power. As I will show below, there is reason to believe that individuals differ in the rate at which they become increasingly independent of the expert power of an information source.

The review of literature on dogmatism showed that an individual's level of dogmatism has important effects on the way the individual processes information which he receives from certain sources. Open and closed minded persons differ in their orientation to information sources and in their modes of reliance on the information they receive from such sources. The study by Fredric Powell (1962) demonstrated that open minded persons are more able to distinguish between information received from a source and information (personal beliefs) about the source. A closed minded person's orientation to an information source is therefore more affected by his personal beliefs (positive or negative) about the source than is the orientation of an open minded persons. The way in which a closed minded person processes the information which he receives from a source will therefore depend on whether he has a positive or negative evaluation of that source. The open minded person on the other hand is more able to evaluate the correctness or usefulness of the source's information on its own merits (independent of his personal evaluation of the information source). The importance of Powell's study is that it suggests that the relative inability of closed minded subjects to discriminate between information received from a source and beliefs about the source results in an orientation to the information source which is biased by the subject's personal evaluation of the source.

The study by Vidulich and Kaiman (1961) demonstrated that the different orientations to a source of information which are characteristic of open and closed minded persons do affect the way in which subjects rely on an information source and process the information which they receive from them and from their own senses. The results of the Vidulich and Kaiman study demonstrated that closed minded subjects tend to rely on their own beliefs about a source (here _beliefs_ about the prestige and presumably the expertness of the source) while open minded subjects pay more attention to the correctness of the source's information. In effect, closed minded subjects tended to discount the information which they received from their own visual senses in favor of the information which they received from a positively evaluated information source. Open minded subjects however did not allow their evaluation of the source's information to be colored by their evaluation of the source and tended to rely more on their own perception of the autokinetic effect and less on the perceptions of the source. This greater tendency of closed minded persons as compared with open minded persons to rely on the cognitive processes of an authority and less on their own was also demonstrated in the Restle, Andrews, and Rokeach study (1964).

The review of literature on dogmatism also showed that an individual's level of dogmatism has important effects on the way the individual processes information which he receives from _any_ source. Here information from _any_ source includes information which a person may receive from his own cognitive processes or as a result of the cognitive processes of others. A number of studies showed that closed minded persons are less able to synthesize or integrate new beliefs into a new belief system than are open minded persons. This differential ability to synthesize means that closed minded persons are also less able to modify a source's information to fit their own situation than are open minded persons. Such a consequence of this differential ability to synthesize was demonstrated in the study by Restle, Andrews, and Rokeach (1964). In the Restle et.al. study, closed minded subjects were less able to use the experimenter's reinforcements in a problem which apparently required the ability to synthesize (the oddities problem) than were open minded subjects. Closed minded subjects were therefore more passive and dependent in their reliance on the experimenter than were open minded subjects who attempted to discover for themselves the objective basis of the experimenter's reinforcements. The effects of this differential ability to synthesize information are especially pronounced when subjects are required to integrate new information which is at odds with or contradicts their own beliefs -- as was the case in the Denny Doodlebug problem and in the studies by Kleck and Wheaton (1967), Ehrlich (1961) and Costin (1965). Since open minded persons are less passive in their reliance on an authority and more active in trying to integrate new information in order to discover the objective basis of an authority's information, the expert power of an information source should diminish more quickly for open minded persons than for closed minded persons. I concluded that, in decision making situations which require the ability to synthesize, closed minded persons -- because of their biased orientation towards information sources and because of their inability to integrate information which they receive from information sources and from their own senses -- perform more poorly in such situations than do open minded persons. However, in decision making situations which only require the ability to analyze, closed minded persons are able to simply rely on the information from an authority and will therefore perform better than open minded persons if the authority provides either simple reinforcements or correct information.

I mentioned above that there are certain problems present in the literature on dogmatism. The major problem is the lack of a satisfactory conceptual or operational definition of the analysis and synthesis phases of problem-solving. The reader will recall that, according to Rokeach (1960), the _analysis_ phase consists of the cognitive processes or activities by which _specific_ beliefs, currently held by the individual, are modified or overcome and replaced with new and different beliefs. The _synthesis_ phase consists of the cognitive processes by which new beliefs (which the individual acquires in the analysis phase) are integrated into a new belief _system_. Analysis therefore refers to the modification or replacement of only single beliefs while synthesis refers to the modification or replacement of entire belief systems. The conceptual difficulty which one has with the terms analysis and synthesis is similar to one which political scientists often encounter -- it centers on the term _system_.

In his discussion of the nature of a belief _system_, Rokeach (1960) only says that "the _belief system_ is conceived to represent all the beliefs, sets, expectancies, or hypotheses, conscious and unconscious, that a person at a given time accepts as true of the world he lives in." (p.33) Such beliefs constitute a system because they are somehow organized or interrelated with each other. Rokeach also states that the nature of this organization of beliefs into a belief system is such that beliefs "may or may not be logically related." (1960, p.34. Emphasis mine.) While admitting the possibility that the nature of a belief system's organization may not be logical, one is not told what a non-logical organization would look like. Rokeach believes that an individual's belief-disbelief system (his belief system and his various disbelief subsystems) "can be described in terms of the structural arrangements of their parts." (1960, p.34) However, in the theoretical literature on dogmatism, the parts whose structural arrangements are described are not specific beliefs but rather entire belief systems and various disbelief subsystems. The literature does not say what sort of a structural arrangement of beliefs constitute a belief system but rather discusses how belief systems are arranged in an open or closed fashion. The importance of this conceptual difficulty in the definition of system is that it makes it practically impossible to know exactly what is meant by the term synthesis and practically impossible to measure synthesis when it occurs. Rokeach reports that this latter operational difficulty was handled in The Open and Closed Mind (1960) by taking three separate measures of synthesis for the Denny Doodlebug problem. These three measures as well as various measures of recall which were used by Rokeach and other to test hypothesized differences in the abilities of open and closed minded persons to synthesize were discussed above. It is important to note that with the single exception of experiments with the Denny Doodlebug problem all tests of the ability of open and closed minded persons to synthesize are based on recall measures, i.e. on the subject's ability to recall specific belief which were integrated.

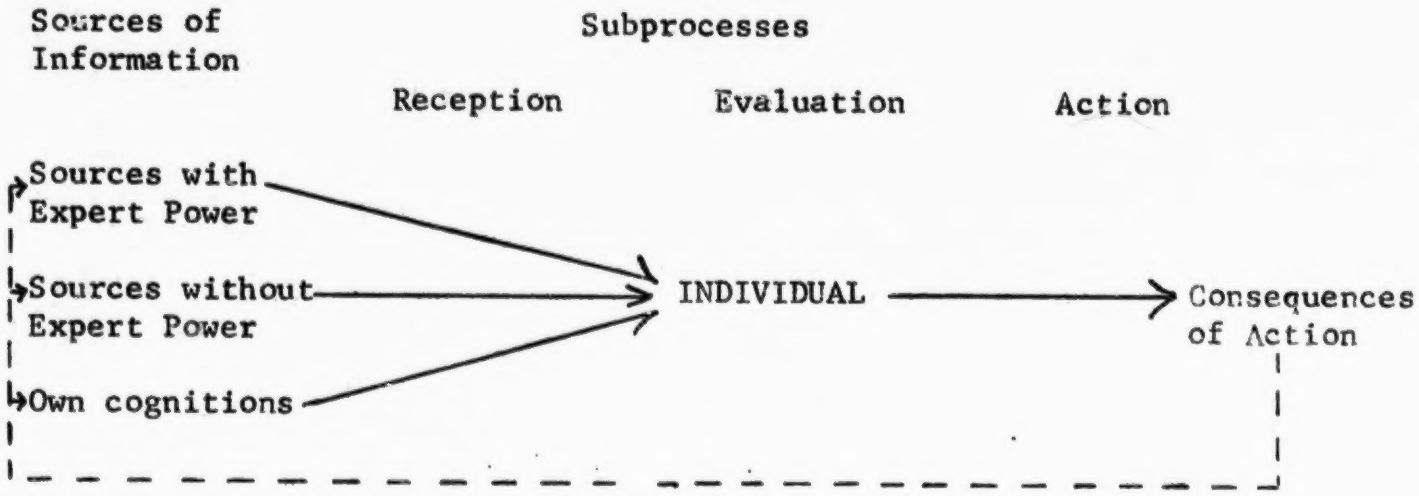
In the following chapter, I will present the theoretical rationale, research problems, and hypotheses for this study. In the theoretical rationale, I will draw on the preceding review of literature in order to make a series of if-then statements. On the basis of the preceding review of literature, it is possible to say (1) what effects the expert power of an information source has on certain choice behaviors; (2) what effects the individual's level of dogmatism has on the individual's orientation to and reliance on an information source; and (3) what effects the individual's level of dogmatism has on the way the individual processes information which he receives from his own cognitions and the cognitions of others. In the theoretical rationale, I will take these observed effects and use them for the "if" clause in my if-then statements. I will argue that if these effects which have been observed in certain situations are due to systematic variation, then similar effects should be observed in other analogous situations. In some cases I will argue that the variables of expert power and dogmatism each should have significant main effects, i.e. each effect occuring independent of the occurance of the other, and in other cases I will argue that the two variables should have a joint or interactive effect on certain behaviors. The presentation of research problems will rely directly on this series of if-then statements. A given research problem will be a statement of intent to determine whether the then clause of a particular if-then statement is valid. In the research problem I will specify the similar effects I expect to observe and the nature of the situation in which I expect these effects to occur. The hypotheses will follow directly from the research problem. A given hypothesis will not only state the relationship which I expect to occur between expert power, dogmatism, and certain dependent variables but will also state in operational terms the nature of measures of both independent and dependent variables.

CHAPTER II

Theoretical Rationale, Research Problems and Hypotheses

While I have said that an individual's decision making process consists of the temporally sequential subprocesses by which the individual receives, evaluates, and acts on information under conditions of uncertainty, I shall show that it is more fruitful to conceive of an individual's decision making process as a set of such subprocesses. The size of such a set may vary from one (reception, evaluation, action) to infinity (reception, evaluation, action; reception, evaluation, action; etc.) By definition, an individual cannot be said to be making a decision if the set of such subprocesses is empty, i.e. equals zero. If the size of the set equals one, then the individual receives information, evaluates it, and may or may not base his action on it. The action in this set of subprocesses is a choice among specified alternative responses. In such a decision making process where the size of the set of subprocesses equals one, the individual's discrete choice is equivalent with his decision. However, in decision making processes where the size of the set of subprocesses is greater than one, the individual's discrete choice at time *x* (or trial *x*) cannot be said to be equivalent with his decision. Here the difference between a choice and a decision is similar to the difference between a tactic and a strategy. A tactic is a choice, at a given moment, of some alternative response. A strategy is a decision to consistently choose, over time, some particular response alternative or some particular combination of response alternatives. In decision making processes where the size of the set of subprocesses is greater than one, the individual goes through a series of subprocesses in which he receives, evaluates, and acts on information. If an individual's actions have certain consequences (either rewarding or unrewarding), then knowledge about these consequences is new information which may also be received, evaluated, and acted upon. Such new information may also be perceived directly by the individual or provided by other sources. Such a series of subprocesses, for a set of subprocesses greater than one, is schematically represented below:

FIGURE 2.1. SERIES OF SUBPROCESSES IN INDIVIDUAL DECISION MAKING.


Sources of Information
Subprocesses
Reception
Evaluation
Action
Sources with Expert Power
Sources without Expert Power
Own cognitions
INDIVIDUAL
Consequences of Action

As I will show below, this more elaborate conceptualization of an individual's decision making process is useful for two reasons. First, this conceptualization can be used to isolate the effects of expert power and dogmatism on an individual's decision making process. I will use the conceptualization to integrate various findings on the effects of expert power and dogmatism and to pin-point where in an individual's decision making process such effects occur. Second, this conceptualization can be used to develop more adequate conceptual and operational definitions of the analysis and synthesis phases of mental activity in decision making processes.

I will consider the effects of expert power and dogmatism on an individual's decision making process where the size of the set of subprocesses is greater than one. Only in such decision making processes may an individual receive (from some source) information about the consequences of his actions. The literature on expert power indicates that this variable has its greatest effects on the initial stages of an individual's decision making process. Individual who experience uncertainty of judgement in decision making situations do tend to look to other persons for information and are most willing to receive information from sources whom they believe to possess expert power. Furthermore, individuals tend to evaluate such information favorably and base their actions on it. In the initial stages of an individual's decision making process, the individual relies on an authority whose information can be used to resolve the uncertainty by simply choosing in accordance with the information. If the authority's information is that a particular choice will be more rewarding than some other choice, then the individual will choose this alternative. Thus far, in the absence of other information, the individual's reliance on the authority is complete. However, there are two reasons why the individual may become increasingly independent of the authority. In the first place, information about the consequences of his choices may be directly available to the individual, i.e. the individual may be able to see for himself whether the consequences of a particular choice are rewarding or not. If such information is available to the individual, he can determine whether this new information is consistent with that provided by the authority. The individual, having received new information, is now in a position to evaluate both sets of information. After completing this evaluation subprocess, the individual is able to base his actions on either set of information (if the two sets are inconsistent) or on both sets of information (if the two sets are consistent). In either case, the individual becomes increasingly independent of the authority since (1) the individual is using the authority's information because it does lead to rewarding choices and is not using it simply because it comes from a source which he believes has expert power, and since (2) the individual is continually receiving new information about the consequences of his actions which he may evaluate for himself and use to test the validity of the authority's information. Even though an individual may become increasingly independent or an authority for either or both of these two reasons, the literature on dogmatism indicates that open and closed minded persons differ in their respective abilities to do so.

The literature on dogmatism indicates that this variable does not account for any differences between individuals in the initial stages of the individual's decision making process. Both open and closed minded persons are equally likely to look to other persons for information and equally likely to use information which they receive from sources who have expert power. Differences between open and closed minded persons occur when one considers how they rely on and use such information. Two such differences are mentioned in the literature. The first has to do with contrasting modes of reliance on an authority and the second has to do with the abilities to analyze and synthesize in problem-solving situations. These two differences between open and closed minded persons occur at some point past the initial state of an individual's decision making process, i.e., past the stage during which the individual first uses the authority's information to resolve the uncertainty of judgement which he first experiences as he enters the decision making situation. The individual's decision making process moves past this point as he begins to receive new information on his own (i.e., independent of the authority).

As open and closed minded persons receive new information about the consequences of choices based on an authority's information, open and closed minded persons differ in how they rely on and use the authority's information. Closed minded persons rely more passively on an authority's information because it comes from a source whom they believe has expert power than do open minded persons who are more active in using the new information about the consequences of their actions to test the validity of the source's information. The open minded person relies on the authority's information for instrumental purposes -- to lead to rewarding choices. The closed minded person on the other hand relies on the authority's information for more expressive purposes -- his reliance expresses his beliefs about the expert power of the source.

Open and closed minded persons also differ in how they rely on and use the new information which they receive independent of the authority about the consequences of their choices which were based on the authority's information. This difference between open and closed minded persons has to do with their abilities to analyze and synthesize in problem solving situations. The more elaborate conceptualization of an individual's decision making process which I presented above can be used to develop conceptual and operational definitions of analysis and synthesis which are more adequate than those which appear in the literature on dogmatism. From the above conceptualization, it can be seen that *analysis* is completed *only within* a single set of subprocesses of an individual's decision making process. In keeping with Rokeach's definition of analysis, this phase of mental activity cannot begin until the individual has received some information. After information is received, the result of an individual's evaluation subprocess may or may not be the replacement of a specific belief which the individual holds with some new belief. If the individual has a belief about which is the most rewarding *choice* which he can *next* make, this belief may or may not be replaced with a new similar belief. For my purposes, I will therefore define *analysis* as a single set of subprocesses, which may occur at any stage of an individual's decision making process, during which the individual (1) receives new information which is inconsistent with currently held beliefs about available *choices*, and (2) changes his beliefs in accordance with the new information. Operationally, analysis is defined as the reception of information which negatively reinforces a particular choice which the subject has made and the selection of a new choice which is consistent with the new information.

I will show in a similar fashion that *synthesis* is completed *only over* a series of subprocesses in an individual's decision making process. In keeping with Rokeach's definition of synthesis, this phase of mental activity cannot begin until the individual has received three sets of information. In order for synthesis to occur, the individual must not only receive information about how to choose at a particular point in time and other new information which is inconsistent with currently held beliefs, but the individual must also receive a third set of information about the consequences of his new choices which he made in accordance with the new information. Synthesis therefore cannot begin until after the individual has been engaged in analysis and has received this third set of information. If the individual has a belief about the most rewarding decision he can make over time, this belief may or may not be replaced with a new similar belief about some other decision. For my purposes, I will define synthesis as a series of subprocesses, which may occur at any post-analysis stage of an individual's decision making process, during which the individual (1) receives new information which is inconsistent with currently held beliefs about available decisions, and (2) changes his beliefs in accordance with the new information. Operationally, synthesis is defined as the reception of information which negatively reinforces a particular decision which the subject has made and the selection, at some point past the analysis stage, of a new decision which is consistent with the new information. Analysis therefore refers to the replacement of beliefs about choices (selection of some alternative response at a given moment) while synthesis refers to the replacement of beliefs about decisions (the consistent selection of a particular alternative response over time). These alternative definitions of analysis and synthesis avoid the difficulties of the term "system" and lead directly to clear-cut measures of the occurence of the two phases.

In the analysis phase, as defined and measured by Rokeach, open and closed minded persons did not differ in their abilities to replace currently held beliefs with other new beliefs. While this may be true (at least in the imaginary world of Joe Doodlebug), I will show that it is reasonable to hypothesize that open and closed minded persons do differ in this regard when their currently held beliefs are based on information from an authority (a source of information whom they believe to possess expert power). In the synthesis phase, as defined and measured by Rokeach, closed minded persons were less able to integrate specific beliefs (acquired in an analysis phase) than were open minded persons. As I will show below, it is reasonable to hypothesize that such a difference will also occur in the synthesis phase as I have defined it.

It is now possible to make a series of if-then statements which, together with the above discussion, serve as the theoretical rationale for this study. These statements will be about the effects of expert power and dogmatism which have been observed and the effects which can be expected to occur on an individual's decision making process. For each statement, I will present the research problem, hypotheses, and operational measures of both independent and dependent variables. Each research problem is a statement of part of what this study is designed to determine. Each hypothesis is a statement of what is expected for each research problem. The presentation and discussion of operational measures will briefly describe how the research problems will be investigated. The full discussion of the instruments and procedures used in this study will appear in the next chapter on methodology which will also present the way in which the hypotheses were tested.

I. Effects of expert power on the initial stage of individual decision making.

A. Statement: If individuals do not differ in their willingness to use information from sources who have expert power to resolve their uncertainty of judgment in ambiguous situations, then open and closed minded persons should not differ in their willingness to make their initial choices on the basis of information provided by a source whom they believe to have expert power.

B. Research problem: to determine whether open and closed minded persons, who do not have any information about the actual consequences of alternative responses in a decision making situation, will choose in accordance with an authority's information.

C. Hypothesis: Both open and closed minded persons will first choose in accordance with an authority's information when they do not have any information about the actual consequences of alternative responses in a decision making situation.

D. Operational measures:

1. First choice. The decision making situation which will be used to test the above and other hypotheses is a Two-Person Game (TPG) experiment.[1] In this experiment, the S is presented with a 2X2 game matrix where his alternative responses are represented by the two row choices and a second persons alternative responses are represented by the two column choices. The cells of the matrix contain numerical pay-off points which both persons may win. Two numerical values appear in each cell -- one for each player. Persons may win their respective pay-off points in a particular cell if they make the particular row and column choices which result in that cell. For example, the following diagram shows that cell #1 would result from the row choice "A" and the column choice "X". If this were the case, the row player (Player 1) would receive the pay-off points (P_{row}) which by convention are listed first in each cell.

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[1] This experimental situation is used in a number of hypotheses which follow and will simply be referred to as the Two-Person Game (TPG) experiment. The complete experimental situation will be fully described in the following chapter. The description which appears here is intended to help the reader visualize how the research problem was investigated.

FIGURE 2.2. RESULTANT CELL FOR AN "A" ROW CHOICE AND AN "X" COLUMN CHOICE IN THE 2X2 GAME MATRIX. TPG EXPERIMENT.

Player 2
Column Choice

		X	Y
Player 1	A	Cell 1 Pr,Pc	
	B		

An important feature of the TPG experiment is that the column choices are determined not by another person or subject but by the experimental apparatus. In this way, the column choices of "Player 2" can be programmed ahead of time. The importance of this feature is that it is used to have Player 2 choose differently than the authority's information indicates to the subject, who takes the position of Player 1. The programmed choices of Player 2 are inconsistent with the authority's information and negatively reinforce the choices which the subject bases on the authority's information.

In this decision making situation, the subject's choice is his selection of alternative response "A" or "B" on any trial. The first choice of the subject is his choice on trial 1 - prior to receiving information about the other player's choice.

2. Information from an authority. This information is provided in the TPG experiment by the experimenter who is presented to subjects as the person who developed the game and observed persons playing it. The information is a statement from this person about how Player 2 is likely to choose and therefore about how the subject should choose in order to win as many points as possible. While this procedure was used to establish the expert power of the experimenter, no direct measure was taken of the subject's perception of this source as one who possessed expert power.

3. Open and closed minded persons. High school students who were selected on the basis of extreme scores on a modified version of the Rokeach Dogmatism Scale (Form E) comprised the experimental groups of open and closed minded subjects. I will discuss the procedure for selecting subjects and the modified version of the dogmatism scale in the following methods chapter. This procedure and instrument is also used for all of the following hypotheses and will be simply referred to as Dogmatism.

II. Effects of expert power and dogmatism on the analysis stage of individual decision making.

A. Statement on the effects of expert power: If, as is believed by French and Raven (1959), an individual's use of information form an authority does produce "a new dognitive structure which is initially relatively dependent" on the authority, then individuals who use information from an authority should complete the analysis stage at a later point in their decision making process than should individuals who do not use information from an authority.

Statement on the effects of dogmatism: If, as has been shown by Rokeach (1960), open and closed minded persons do not differ in their ability to perform in the analysis phase of problem-solving situations, then open and closed minded persons should complete the analysis at the same point in their decision making processes. However, if open and closed minded persons do differ in how they rely on and use information from an authority (Restle, Andrews, and Rokeach, 1964), then closed minded persons who use information from an authority should complete the analysis stage at a later point in their decision maing process than should open minded persons who also use information from an authority.

B. Research problem: to determine whether there is an interactive or joint effect of expert power and dogmatism on the point at which individuals complete the analysis stage of their decision making process.

C. Hypothesis: Closed minded persons who use information from an authority will complete the analysis stage at a later point in their decision making process than will open minded persons who do not use information from an authority.

D. Operational measures: The above hypothesis is tested in two experimental situations. The first situation is the TPG experiment which was described above. In the TPG experiment, the operational measures are:

1. Expert power (same as above)

2. Dogmatism (same as above)

3. Point at which the analysis stage of an individual's decision making process is completed. Recalling the above operational definition of analysis, this stage is complete only after the subject has received information

which negatively reinforces a particular choice which the subject has made and has selected a new choice which is consistent with the new information. In the TPG experiment, the programmed choices of the other player negatively the choice which is consistent with the authority's information (and with the subject's own intuition). In the TPG experiment, the point at which the individual's analysis stage is completed is the trial on which he selects the response which is consistent with the information provided by the choices of the other player.

The second experimental situation in which the above hypothesis is tested is a Political Issue (PI) experiment. I developed the PI experiment to test this and the following two hypotheses in a more realistic situation than is provided by the TPG experiment.

The Political Issue experiment is a paper and pencil instrument which presents the subject with the current political issue of whether the United States should stay and fight in Viet Nam. In the treatment version of the instrument, the pro position is advocated by President Johnson -- a source who presumable has some expert power in this issue area. In the control version, no source is presented for either the pro or con position. After the subject indicates his own position on the issue, he is presented with list of reasons which support the opposite position. Reasons are presented one at a time and after reading each reasons which would support the opposite belief the subject is asked to indicate whether he would now (1) maintain his original position, (2) adopt the opposing position, or (3) be uncertain about maintaining his original position or adopting the opposing position.

The PI experiment is surely less rigorous than the TPG experiment. There are certain difficulties in using such an instrument which will be discussed along with the full description of the instrument in the following chapter. Nevertheless, the PI experiment does provide a decision making situation which is more realistic for the subject than the TPG experiment. The PI experiment presents the subject with a situation in which he can make alternative responses which are psychologically meaningful to him and in which he receives the kind of information which he is likely to encounter in his own life. The major reasons for using this additional experiment are that it (1) will serve in an attempt to establish convergent validity for some of the hypotheses -- i.e., the experiment can be used to try to demonstrate that similar relationships among variables hold in different situations, and (2) will increase the generality of the findings - from one rather unique experimental situation to an area which seems more true to life.

In the PI experiment, the operational measures for the above hypothesis are:

1. Expert power. The presentation of President Johnson as a source of information who advocates the pro position on the issue of staying and fighting in Viet Nam.

2. Dogmatism. (same as above)

3. Point at which the analysis stage of the individual's decision making process is completed. In the PI experiment, this point is the trial on which the subject either selects the opposing position or indicates doubt in his original position. The subject's selection of either of these two responses will be used to indicate a change of original belief.

III. Effects of expert power and dogmatism on the synthesis stage of individual decision making.

A. Statement on the effects of expert power: If, as is believed by French and Raven (1959), individual's become increasing independent of the expert power of a source of information as they modify the source's information to fit their own particular situation and/or as they discover for themselves knowledge on which one may base his expert power, then individual's who use information from an authority should complete the synthesis stage at a later point in their decision making process than should individuals who do not use the authority's information and do not have to become independent of it.

Statement on the effects of dogmatism: If, as has been shown by Rokeach (1960), closed minded persons are less able to perform in the synthesis phase of problem-solving than are open minded persons, then closed minded persons should complete the synthesis stage at a later point in their decision making process than should open minded persons. In addition, if open and closed minded persons do differ in their ability to distinguish between information from a source and personal beliefs about the source (Powell, 1962) and also differ in how they rely on and use information from an authority (Restle, Andrews, and Rokeach, 1964), then closed minded persons who use information from an authority should complete the synthesis stage at a later point in their decision making process than should open minded persons who do not use information fraom an authority.

B. Research problem: to determine whether there is an interactive or joint effect of expert power and dogmatism on the point at which individuals complete the synthesis stage of their decision making process.

C. Hypothesis: Closed minded persons who use information from an authority will complete the synthesis stage at a later point in their decision making process than will open minded persons who do not use information from an authority.

D. Operational measures: The above hypothesis is tested in both the TPG experiment and in the PI experiment. In the TPG experiment, the operational measures are:

1. Expert power (save as above)

2. Dogmatism (same as above)

3. Point at which the synthesis stage of an individual's decision making process is completed. Recalling the above operational definition of synthesis, this stage is completed only after the subject has (1) received new information which negatively reinforces a particular choice which he has made, (2) selected a new choice which is consistent with the new information, (3) received information which is inconsistent with currently held beliefs about available decisions, and (4) made a decision to consistently choose, over time, a particular alternative response.

   In the TPG experiment, a criterion of ten consecutive responses which are all consistent with the information provided by the choices of the other player is used to indicate when synthesis has occurred.[1] I arbitrarily selected the trial on which the subject began this criterion string of consecutive responses as the measure of the point at which the synthesis phase is completed.

In the PI experiment, the operational measures are:

1. Expert power (same as above)

2. Dogmatism (same as above)

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[1] Ten consecutive responses is often used, by convention, as a criterion measure of human learning.

3. Point at which the synthesis stage of an individual's decision making process is completed. In the PI experiment, subjects were only presented with a series of thirteen reasons for changing their original position. In the PI experiment, I selected a rather weak criterion of two consecutive responses both of which were consistent with the reasons presented to justify changing one's position.[1] However this criterion is of the selection of the opposing position by the subject and does not include selection of the uncertain position.

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[1] Adoption of a more stringent criterion would have required that I exclude from the analysis a large number of subjects who did not make more than two consecutive choices of the opposing position.

CHAPTER III

Method

In the spring of 1967, high school students in grades nine through twelve of six public high schools in five Michigan communities participated in three separate research procedures. Entire classes in courses which were required at each grade level took part in the first and second research procedures. The first research procedure was the administration of a modified version of the Rokeach Dogmatism Scale. The second research procedure was the administration of an original paper-and-pencil instrument which I developed for the Political Issue Experiment. After completing the Dogmatism Scale during the first administration, subjects volunteered to participate in a third research procedure which was held from two to three weeks later. The third research procedure was an original experiment which I developed for the Two-Person Game Experiment.

A total of 1051 students completed the modified version of the Dogmatism Scale. The modified version of Form E of the Dogmatism Scale was developed by Pannes (1962) for use with junior and senior high school populations. This version retains the forty items of the original scale and supplements twenty-five of the original items with a revised item. The revised item is a statement which is similar to the original statement and incorporates word changes which were suggested by a group of junior high students in a pre-test completed by Pannes (p.94). The revised item or "supplemental statement" is placed in brackets under the original statement in the modified version of the scale.

Following the procedure used by Pannes, subjects were instructed that (1) supplemental statements appeared in brackets under twenty-five of the original (Dogmatism) items to aid understanding the meaning of the original item and (2) both items had the same meaning. Pannes reports that some teachers felt a response procedure which used positive and negative numbers (-3 through +3) to represent strength of disagreement or agreement might be too difficult for some of the students in Pannes' test sample (p.96). Because of this anticipated difficulty in using positive and negative numbers, Pannes used a check list which allowed the subject to check one of the three strengths of agreement on one side of an item or one of three strengths of disagreement on the other side of the item.

I used a different response procedure for the modified version of the Dogmatism Scale than did Pannes. In the study by Pannes, some of the subjects were seventh and eighth graders and it was probably this group of students who would have had problems using positive and negative numbers to indicate strength of agreement or disagreement with the statements in the scale. In a pre-test in High School Y, I found that students in grades nine through twelve had no difficulty in using positive and negative numbers in responding to the dogmatism items. The pre-tested response scheme consists of positive and negative numbers (+3 through -3) that represent various strengths of agreement and disagreement, respectively. The response scheme appeared at the top of each page of dogmatism items. Subjects indicated their response to each of the forty items on off-set printed

IBM forms that were designed to facilitate use of the response scheme.

The Dogmatism Scale was presented to students as a personal opinion questionnaire. Although subjects were instructed to write their names on the face sheet of the questionnaire, they were assured that individual results would remain anonymous. Classroom teachers and school personnel did not participate in this or any other research procedure. The modified version of the Dogmatism scale appears in the form in which it was administered as Appendix I.

The reliabilities of the modified version of the Dogmatism Scale compare favorably with those obtained by Rokeach for college populations. (Table 3.1) While the reliabilities compare favorably, it should be noted that most of the reliability coefficients are fairly low. In some cases (e.g. grades 11 and 12), the reliability coefficient indicates that scores on the Dogmatism Scale account for less than half of the variance in that scale. The low reliability of the modified versions of the Dogmatism Scale had significant effects on the redesign and re-analysis of this research. I originally classified an individual as high or low on dogmatism if his score on the scale fell above or below the overall mean. However, the difficulty raised by the low reliability of the scale is that some individuals who were classified as high should have really been classified as low. That is, although an individual's obtained score was higher than the overall mean, the individual's true score might be lower than the overall mean. The difficulty raised then by the low reliability of the scale is that individuals are likely to be misclassified. I will describe the extreme groups method which I used to minimize classification errors in the following Chapter on analysis.

TABLE 3.1. RELIABILITIES* OF ORIGINAL AND MODIFIED DOGMATISM SCALE E

Original Form E			Modified Form E		
Group	N	r	Group	N	r
English colleges II	80	.81	Grade 7	127	.85
Ohio State U. I	22	.85	Grade 8	119	.82
Ohio State U. II	28	.74	Grade 9	134	.91
Ohio State U. III	21	.74	Grade 10	116	.87
Ohio State U. IV	29	.68	Grade 11	78	.76
Mich. State U. IV	89	.78	Grade 12	101	.71

*Corrected split-half reliability coefficients

Sources: Original Form E -- Rokeach, 1960, p. 90

Modified Form E -- Pannes, 1962, p. 104

Although subjects respond to the forty items of the scale with a six point forced-choice procedure, I scored the scale by summing the number of items agreed with irrespective of the indicated strength of agreement. The theoretical range of the Dogmatism Scale is therefore 0 to 40 with high scores indicating closedness of belief system. This scoring procedure was used because it corresponds to the procedure now used by Rokeach[1] and because there is some evidence which indicates that most of the variance in the Dogmatism Scale is primarily associated with the S's direction of response and not with the S's strength of response. (Shupe and Wolfer, 1966) Table 3.2 presents average dogmatism scores for male and female students in each grade of the six high schools.

The second research procedure was the administration of the Political Issue Experiment. The original paper-and-pencil instrument which I developed for the Political Issue Experiment has already been described in Chapter II. In this chapter I will describe the procedure for administering the instrument and the methods I used to develop the instrument.

The PIE instrument was administered to entire classes in courses that were required at each grade level in high schools A, B, C, D, E, and F. The S first read a statement which indicated that the United States should stay and fight in Viet Nam until the communists stop trying to take over that country. In the treatment version,

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[1] (Conversation with Milton Rokeach, summer 1967)

TABLE 3.2. AVERAGE (MEAN) DOGMATISM SCORES OF FEMALE AND MALE STUDENTS IN GRADES NINE THROUGH TWELVE OF MICHIGAN HIGH SCHOOLS (A, B, C, D, E, F)[a]

Grade	Sex	School A	B	C	D	E	F	Sex Totals (Within Grade)	Grade Totals
9	Female	b	b	25.95 (5.27) (19)	24.38 (4.21) (16)	23.57 (4.50) (30)	b	24.46 (4.80) (65)	24.64 (4.70) (134)
	Male	b	b	26.05 (4.10) (19)	25.04 (4.87) (23)	23.74 (4.41) (27)	b	24.81 (4.58) (69)	
10	Female	20.88 (5.17)[c] (32)[d]	21.50 (4.91) (40)	23.37 (5.90) (19)	23.57 (5.51) (21)	20.83 (5.69) (36)	23.45 (4.40) (11)	21.86 (5.40) (159)	21.99 (5.23) (319)
	Male	19.06 (4.90) (35)	23.61 (4.82) (28)	22.90 (5.28) (21)	22.85 (4.03) (40)	21.62 (4.12) (21)	24.27 (5.36) (15)	22.13 (5.00) (160)	
11	Female	18.61 (4.42) (23)	17.56 (5.16) (41)	21.85 (4.91) (34)	20.62 (4.52) (16)	23.73 (6.00) (11)	19.22 (5.48) (37)	19.71 (5.43) (162)	20.39 (5.55) (330)
	Male	21.15 (4.65) (27)	18.12 (4.64) (33)	22.71 (5.60) (31)	21.62 (6.67) (26)	20.78 (3.57) (9)	21.78 (5.49) (42)	21.05 (5.58) (168)	
12	Female	18.10 (5.51) (41)	17.81 (4.09) (27)	22.00 (3.83) (6)	22.13 (4.48) (23)	22.45 (5.50) (20)	22.92 (5.13) (26)	20.34 (5.47) (143)	20.73 (5.50) (268)
	Male	20.72 (5.04) (36)	18.32 (5.85) (19)	23.75 (7.98) (4)	21.70 (6.19) (27)	22.40 (7.31) (10)	22.34 (5.90) (29)	21.18 (6.08) (125)	
School Totals		19.70 (5.18) (194)	19.51 (5.40) (188)	23.44 (5.50) (153)	22.72 (5.30) (192)	22.40 (5.23) (164)	21.82 (5.67) (160)		
Sex Totals		Female	21.11	(5.57)	(529)				
		Male	21.91	(5.53)	(522)				
Grand Total		21.51	(5.56)	(1051)					

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[a] Schools A and B are in Community 1. Other schools are in separate communities.

[b] Grade nine not offered in A, B, and F.

[c] Standard deviation (s).

[d] Cell frequency (n).

this statement was attributed to President Johnson; in the control version, the statement was not attributed to any source. The S then took either a pro or a con position on the Viet Nam issue by indicating whether he agreed or disagreed with the original statement. After indicating his own position, the S encountered thirteen new statements which tended to contradict his own position on the issue. These statements were not attributed to any source and were presented one at a time. After reading each statement, the S indicated whether he wanted to: (1) change his original position; (2) keep his original position; or (3) was unsure about changing or keeping his original position. The thirteen statements in the PIE instrument were ordered in terms of increasing severity, i.e., statements which least strongly contradicted the S's position occurred first and statements which most strongly contradicted the S's position occurred last. The thirteen statements were presented to the S under the pretext that the researchers wanted the S to answer some general open-ended questions about the Viet Nam situation. Since the researchers realized (the S is told) that some students know more than others about Viet Nam, all students will first read some statements about Viet Nam and then go on to answer the general questions. After reading each statement, the S is asked to indicate whether he would now change his original position, keep his position, or is uncertain one way or the other. Subjects are asked to indicate one of these three responses under the pretext the researchers want the S to use such a response scheme to indicate how important the S thinks each statement is. The entire Political Issue instrument appears as Appendix II.

The task in the development of the paper-and-pencil instrument for the Political Issue Experiment was to devise sets of statements which tended to contradict pro and con positions on the Viet Nam issue and to determine the order in which statements within a set should be administered to the test population. I initially developed, on an *a priori* basis, thirteen statements which dealt with the following topics: (1) the domino theory; (2) the political preferences of the Vietnamese; (3) the capacity of the United States to win the war; (4) the relative costs of fighting the war; (5) the democratic nature of the government of Viet Nam; (6) the duty to fight communism; (7) the feasibility of a peaceful settlement; (8) Vietnamese attitudes towards American soldiers; (9) the relative Vietnamese to American combat losses; (10) the behavior of Vietnamese children towards American soldiers; (11) the honesty of Vietnamese governmental officials; (12) the killing of non-combatants; (13) the absolute level of American combat deaths. For each topic I devised two statements. One supports the pro position on the issue, the other the con position. For example, on the topic of the domino theory, the following two statements support the pro and con positions, respectively: (1) "If the communists win in Viet Nam, they will just go after other countries"; (2) "Even if the communists win in Viet Nam, they will not go after other countries."

I next conducted a pre-test of the two sets of statements with high school students in Community Z. This pre-test was carried out because I wanted to obtain, if possible, general agreement on the order of importance for the statements in each set. If statements could be ordered in a pre-test in terms of their importance as reasons for holding a particular position, then in the experimental test situation the statements could be presented in increasing order of importance, i.e. with the statement which least contradicts the S's position presented first and the statement which most contradicts the S's position presented last. In the Community Z pre-test, students indicated a pro or con position on the Viet Nam issue and then ranked that set of statements which I developed to support that particular position. Students ranked the statements from the appropriate set in terms of their importance as reasons for holding their own position. Entire classes in courses that were required at each grade level were also used for this pre-test.

Table 3.3 gives the results of the analysis of the rankings which were assigned to the various reasons by students in Community Z. The Kendall coefficient of concordance (W) is a measure of the degree of relationship among k sets of rankings (where k = the number of persons who ranked a particular set of statements) (Siegel, 1956). The W's for the Pro and Con columns of Table 3.3 indicate that all students who took the pro position and all students who took the con position agreed very closely in their evaluation of the statements which I designed to support their respective positions. Furthermore, as Table 3.4 indicates, this relationship holds up quite well when each grade level is considered separately.

In the experimental test situation, the contradictory statements which the PIE instrument presents to the S who takes a particular position are the logical reversals of the statements which support that position. For example, if in the test situation a subject takes the pro position on the Viet Nam issue, then he receives the logical reversals of the statements in Table 3.3 which support the pro position.

TABLE 3.3 RELATIONSHIP AMONG RANKINGS OF REASONS[1] FOR PRO AND CON POSITIONS ACROSS GRADES 9 - 12 ON THE ISSUE STAY AND FIGHT IN VIET NAM (HIGH SCHOOL Z) -- ITEMS ORDERED BY SUMS OF RANKS

Position			
Pro		Con	
	Sums of ranks assigned to each reason		Sums of ranks assigned to each reason
REASONS FOR BEING IN FAVOR OF STAYING AND FIGHTING IN VIET NAM		REASONS FOR BEING AGAINST STAYING AND FIGHTING IN VIET NAM	
b. If the communists win in Viet Nam, they will just go after other countries.	92	g. Too many Americans are getting killed.	35
j. The people of Viet Nam do not want to live under the communists.	132	m. American soldiers are doing more fighting and dying then are the soldiers of Viet Nam.	43
a. We can win if we try hard enough.	181	h. Helping Viet Nam is not worth all the money it is costing.	68
h. Helping Viet Nam is worth all the money it is costing.	192	k. The American soldiers are killing a large number of innocent people.	76
c. The government of Viet Nam is a democracy and is supported by the people.	198	j. The people of Viet Nam only want to live in peace.	93
f. The United States must always fight the communists whenever we get the chance.	243	f. The United States does not always have to fight communists wherever we get the chance.	98

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[1] Initial order of items as administered is indicated by letters preceeding the items.

TABLE 3.3. Continued.

i.	You cannot make a peaceful agreement with communists.	272	i.	You can make a peaceful agreement with communists.	104
d.	Most of the people of Viet Nam like the American soldiers.	295	d.	Most of the people of Viet Nam do not like the American Soldiers.	113
m.	The soldiers of Viet Nam are really doing most of the fighting and dying.	316	c.	The government of Viet Nam is not a democracy and is not supported by the people.	118
l.	When the American soldiers arrived in Viet Nam many of the children waved and smiled at them.	321	l.	When the American soldiers arrived in Viet Nam many of the children spit on them.	119
e.	The leaders of the government of Viet Nam are very honest.	335	e.	The leaders of the government of Viet Nam are not very honest.	129
k.	The American soldiers are killing only the communists.	348	a.	We cannot win no matter how hard we try.	135
g.	Not very many Americans are getting killed.	351	b.	Even if the communists win in Viet Nam, they will not go after other countries.	143
	k = 36			k = 14	
	W = .3758			W = .3885	
	$x^2 = 162.34$ df = 12			$x^2 = 65.27$ df = 12	
	$p < .001$			$p < .001$	

TABLE 3.4. RELATIONSHIP AMONG RANKINGS OF REASONS FOR PRO AND CON POSITIONS IN GRADES 9 - 12 ON THE ISSUE STAY AND FIGHT IN VIET NAM (HIGH SCHOOL Z)

	Position									
	Pro					Con				
Grade	k	W	x^2	df	$p<$	k	W	x^2	df	$p<$
9	6	.36	25.77	12	.02	5	.32	18.94	12	.10
10	11	.47	62.00	12	.001	5	.54	32.72	12	.01
11	14	.39	65.45	12	.001	0	-	-	-	-
12	5	.53	31.85	12	.01	4	.65	31.32	12	.01

Note: k=sample size (number of sets of rankings)

Moreover, the contradictory statements are presented in increasing order of importance -- that is, importance in terms of a justification for changing one's original position and in terms of the negative reinforcement which the statements have for the original position. In the above example of the S who takes the pro position, the S first receives the logical reversal of item g (the item ranked last in the Pro column of Table 3.3) and last receives the logical reversal of item b (the item ranked first in the Pro column of Table 3.3). In this example, the S would first receive the statement: "Too many Americans are getting killed." For the thirteenth statement, the S in this example would receive the statement: "Even if the communists win in Viet Nam, they will not go after other countries." In this way, the beliefs which probably support the S's position are contradicted by new information in such a way that it is likely that least important beliefs are challenged first and most important beliefs are challenged last. Challenging the S's beliefs in such a fashion should encourage the S to change his position and should allow individual difference to appear over the series of thirteen trials.

The third experimental procedure was the Two-Person Game experiment which developed for this study. The TPG experiment is better designed to test for the effects which I have hypothesized than is the Political Issue experiment. In both the TPG and the PI experiments, S's receive information which is inconsistent with and tends to contradict their currently held beliefs about choices and decisions. However, only in the TPG experiment is such contradictory information the direct consequence of the S's own response. Also, in the TPG experiment such contradictory information is perceived directly by the S whereas in the Pi experiment such information is presented to the S as a part of the PI paper-and-pencil instrument. The basic experimental situation for the TPG experiment has already been described in Chapter II. In this chapter I will describe the formal design of the experiment, the apparatus which was used in the experiment, and the procedures which Ss followed in the experiment.

The experimental design of the TPG experiment provides a realistic minimal social situation in which the effects of expert power and dogmatism can be determined with a high degree of control. The design provides for pre-programming of the choices of the "other player" and therefore permits variable levels of reinforcement of S responses. Causal normative social influences are minimized in the TPG experiment by the use of four Ss in a non face-to-face group which is not under surveillance by the experimenter-authority.

The game matrix (Figure 3.1) is designed to (1) provide the S with an objective basis for prefering one of the two responses, and (2) make it easier for the S to keep track of his wins and losses in the course of the game.

FIGURE 3.1 GAME MATRIX FOR TPG EXPERIMENT

		Other Player's Position	
		C	D
S Position	A	-20,+15 (Outcome #1)	+20, 0 (Outcome #2)
	B	+20, +5 (Outcome #3)	-20,-15 (Outcome #4)

Given the pay-off values in the cells of the game matrix, the *S* should expect the other player to choose *C* -- the only choice which can result in a positive outcome for the other player. If the *S* does have this expectation, then the *S* will believe that he can choose *B* and receive +20 points while the other player only receives +5 points. While such an expectation seems quite reasonable there are some reasons why the other player might choose *D*. It also seems reasonable to believe that the other player might be dissatisfied with only winning +5 when the *S* wins +20. The other player might choose *D* in an attempt to make the *S* lose more than he himself loses -- as would be the case in Outcome #4. The other player might also choose *D* in an attempt to make the *S* give up *B* and choose *A* instead. If such an attempt were successful, the other player would have a chance of winning +15 points with Outcome #1. In effect, the game matrix is designed to create and justify *S's* preference for a particular choice and also to justify the behavior of the other player when he chose in such a way as to invalidate the *S's* initial response preference.

Subjects should also find it easy to keep track of their performance in the course of the game because they are always either winning or losing 20 points. Moreover, subjects use a score sheet to keep track of their wins and losses on each of the one hundred trials of the game.

The experimenter administers the authority treatment in the TPG experiment. The design of the experiment calls for the experimenter to establish his expertness in the eyes of the Ss by telling them that he developed the game which they are about to play. The authority treatment is information which the experimenter gives the S. The information provided by the experimenter is a statement of his observations of the choices of other students who have taken the position of the other player in the TPG. This information states that the persons who takes the position of the other player is more likely to choose C than D and that therefore the S, in the long run, will win more points if he always chooses B.

The reinforcement conditions are designed to systematically contradict the S's beliefs about the expected relative frequency of the other player's C and D choices and about the choice which he should make. In all reinforcement conditions, the other player chooses D more often than he chooses C. Since Ss in both the treatment and control conditions of the experiment are likely to have the opposite belief about the relative frequency of the other player's choices, the reinforcement conditions (1) negatively reinforces the S's beliefs and the choices which he bases on those beliefs, and (2) lets the S perceive for himself information which is inconsistent with his initial beliefs. A different non-contingent[1] reinforcement schedule was used in each of three different reinforcement conditions. In reinforcement condition I, the other player chooses D 99 times out of 100; in reinforcement condition II, 90 times out of 100; and in reinforcement condition III, 80 times out of 100. Under each reinforcement schedule, it is very likely that the S's B choice will be negatively reinforced on any given trial and that the S's decision to consistently choose B will definitely be negatively reinforced. Table 3.5 gives the probability with which each reinforcement schedule negatively reinforces the S's B choice and the trial numbers of positively reinforcing events (the other player's C choice).

TABLE 3.5 REINFORCEMENT SCHEDULE FOR THE TPG

Schedule	Probability of Negative Reinforcement (D Choice)	Trial Numbers of Positive Reinforcement Events (C Choice)*
I	.99	1
II	.90	1,3,10,14,26,27, 48,58,81,87
III	.80	1,5,12,16,18, 25,31,32,35,41, 55,57,60,64,67, 68,71,80,83,91

* The S's first B response is positively reinforced on the initial anticipatory trial (trial 1) in all reinforcement schedules.

The experimental design of the TPG experiment has six experimental conditions. These six conditions results from (1) the authority treatment and control conditions and (2) the administration of one of the three reinforcement schedules. Subjects participated in the TPG experiment during the class hour in which they had volunteered. From each class, experimental groups of four students each were created by a random sample of male and female volunteers. From each class, experimental groups were first randomly assigned to treatment and control conditions of reinforcement schedule I, then to treatment and control conditions of reinforcement schedule II, and finally -- if there was a sufficient number of students who had volunteered -- to treatment and control conditions of reinforcement schedule III.

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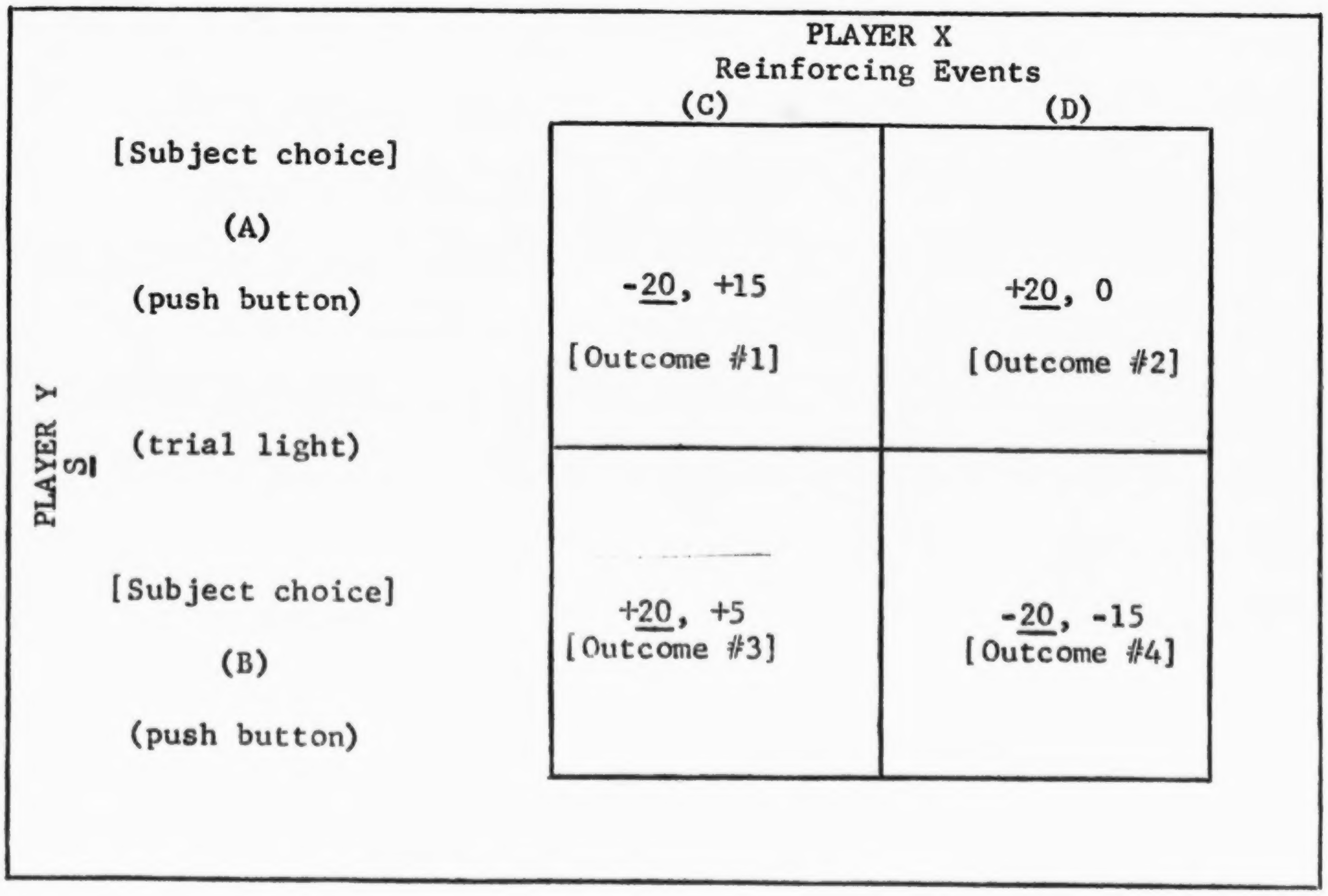
[1] The administration of reinforcing events is not contingent on the S's choice.

The apparatus for the TPG experiment was developed by the author in cooperation with the staff of the Human Learning Research Institute at Michigan State University. The apparatus is called a binary choice apparatus and has three main components: (1) four separate response boxes which subjects use to make their choices and to receive information about the outcome which resulted from their choice and the choice of the other player; (2) a main control unit which is attached to each of the response box and to (3) a data recording unit.

The response boxes (Figure 3.2) are used by _Ss_ in a non face-to-face situation. Each response box has (1) a trial light to indicate the beginning of a trial; (2) a 2X2 game matrix which is printed on velum and placed in a slot in the plexiglass top of the response box; and (3) two doorbell-type push buttons which correspond to the _S's_ _A_ and _B_ row choices. The columns of the matrix represent the choices which the other player may make (_C_ and _D_). Cells of the matrix correspond to outcomes that result from appropriate _S_ and other player choices. In each cell, the point value of the outcome for the _S_

FIGURE 3.2. SUBJECT RESPONSE BOX AND GAME MATRIX -- TOP VIEW


PLAYER X
Reinforcing Events
PLAYER Y
$\underline{S}$
(trial light)

	(C)	(D)
[Subject choice] (A) (push button)	$-\underline{20}$, +15 [Outcome #1]	$+\underline{20}$, 0 [Outcome #2]
[Subject choice] (B) (push button)	$+\underline{20}$, +5 [Outcome #3]	$-\underline{20}$, -15 [Outcome #4]

is printed first in large type and is underlined. The point value of the outcome for the other player is printed second in smaller print. A light under each cell of the matrix lights to indicate the trial outcome for the S after all Ss have made their choices.

The main control unit of the TPG apparatus contains all necessary circuitry. The unit receives and registers inputs from (1) the Ss' choices on the attached response boxes, and (2) a switching module that generates the trial sequence of reinforcing events. The switching module is a Soroban paper tape reader, contained within the control unit, that reads the reinforcement schedule from pre-programmed paper tape. On the basis of these two inputs, the control unit lights the appropriate outcome cell on each subject's response box. A time delay module regulates the time interval during which the appropriate outcome cell remains light.

The control unit also (1) outputs on Teletype paper type the subjects' choices and the reinforcing events for each trial of the game, and (2) resets all circuits and operates the next trial light.

The procedures of the TPG experiment took subjects to three separate stations. At the first station, the experimenter-authority instructed Ss in the play of the game and in the use of the response boxes. These instructions appear as part A in Appendix III. If the experimental group had been assigned to a treatment condition, then the subjects were told that two of them would receive additional information on how to play the game. Subjects received this information from the experimenter-authority when they got to the second station. Subjects received this information under the pretext that the researchers were interested in how two persons played the game when one person had additional information. Subjects in both treatment and control conditions were led to believe that they were randomly assigned to the position of the row player.

At the second station of the TPG experiment, subjects were in a non face-to-face situation. Another experimenter was present but not in a position to observe the subjects' choices. This second experimenter told the subjects that he would turn on the first trial light and after that the game would continue automatically. The experimenter did not have to touch the apparatus during the experiment. As soon as the first trial light came on, each S made his first choice. After all subjects had chosen, one of the outcome cells on each S's response box would light and remain on for about three seconds. Subjects recorded their pay-off for that trial and waited for the next trial light. This sequence was repeated for 100 trials.

Subjects went to the third station of the TPG experiment after completing 100 trials of the game. As a check on the credibility of the contrived interaction in the TPG, each of the four subjects was asked to indicate who he thought he had been playing the game with. Subjects were then debriefed. The general purposes of the research were explained to the students. Students were asked to co-operate in keeping the nature of the game from others who had not yet played it at their school.

CHAPTER IV

Analysis and results

The results of the analysis which I will report in this chapter are for a subgroup of the experimental test population. In general, my preliminary analysis failed to show any significant effects for dogmatism and expert power. The results of this preliminary analysis appear in a series of tables as Appendix IV. In the course of my discussion in this chapter I will refer to some of the results of the preliminary analysis.

A total of 1051 students completed the first research procedure. The average dogmatism scores for this group were reported by school, grade, and sex in Table 3.2. For the preliminary analysis, I classified an individual as high or low on the dogmatism scale if he scored above or below the overall mean of dogmatism scores (21.51), respectively.

As Table 3.2 indicates, there is almost no difference between the average dogmatism score for all males ($\overline{X} = 21.91$) and the average dogmatism score for all females (21.11). While the sex of the respondent does not seem to be related to S's degree of dogmatism, there is some variation in the overall average scores for the four grade levels and for the six high schools.

The grade level of the respondent is apparently directly related to the degree of dogmatism of the respondent. Table 3.2 suggests that there is an inverse relationship between grade level and average dogmatism scores. The average dogmatism scores for the four grades ranged from 24.64 in the ninth grade to 20.39 in the eleventh grade. The average dogmatism score for students in the twelfth grade was about the same as that of the eleventh grade students (20.73). This apparent decrease in dogmatism at higher grade level is consistent with results of a study by Anderson (1962) which did show a significant decline in dogmatism scores over the adolescent years (grade 8 through 12).

Table 3.2 also suggests that there is a significant relationship between the high school of the respondent and the degree of dogmatism of the respondent. The average dogmatism scores for the six high schools ranged from 19.51 (High School B) to 23.44 (High School C). In Table 4.0, I report the results of an analysis of variance which was computed to determine the significance of the apparent relationship of school and dogmatism. As Table 4.0 indicates, this relationship is highly significant. This relationship between school and dogmatism is probably a result of differences in the social class composition of the school communities. Although no data on the social class distribution of the various student bodies were gathered, I and my research assistants are under the impression that the social class of the students and their families at schools A and B was much higher than at any other school. Both High School A and High School B are in the same community and both A and B have the lowest average dogmatism scores. We also felt that the social class level at High School C was lower than any other school. High School C also had the highest average dogmatism score. However, this interpretation of the relationship between school and dogmatism is only based on subjective impressions and casual observation.

TABLE 4.0. ANALYSIS OF VARIANCE OF DOGMATISM SCORES IN HIGH SCHOOLS A, B, C, D, E, F[a]

Source	SS	df	MS	F	p<
Between	2375.68	5	475.14	16.38	.0005
Within	30315.02	1045	29.01		
Total	32690.70	1050			

Dogmatism Means

School						Total
A	B	C	D	E	F	
19.70 (5.18)[b] (194)[c]	19.51 (5.40) (188)	23.44 (5.50) (153)	22.72 (5.30) (192)	22.40 (5.23) (164)	21.82 (5.67) (160)	21.51 (5.5[illegible]) (1051)

[a] Schools A and B are in Community 1. Other schools are in separate communities.

[b] Standard deviation (s).

[c] Cell frequency (n).

In my preliminary analysis, I did consider the respondent's grade level as a factor which could be related to his decision making process. The school of the respondent was not considered as such a factor. The preliminary analysis indicated that the respondent's grade level did not have any significant effects on the major dependent variables. Accordingly, I did not consider the respondent's grade level and school as factors in the re-analysis of the data. However, I did control for the possible effects of grade level and school membership.

For the re-analysis of the data I constituted extreme groups in order to control for the unreliability of the Dogmatism Scale, and the possible effects of grade level and school membership on the dependent measures. The extreme groups consisted of those Ss who scored either extremely high or low on the Dogmatism Scale with respect to their school-grade level mean. Extremely closed or open minded Ss are those who scored in the upper or lower quartile of the distribution of scores for all students of the same grade in the same school. In this way, the S's degree of dogmatism is treated as something which is relative to his particular school population and to his particular grade level. This procedure also controls for the possible effects of grade level and school membership by equalizing the dogmatism scores of individuals which respect to these two variables. The selection of only those who scored in the upper and lower quartiles of their respective school-grade distributions also minimizes the chances of misclassifying an individual as open or closed. For example, if an individual scores substantially above the mean, then his true score is more likely to also fall above the mean than is the obtained score of an individual who scores just above the mean. While my use of extreme groups does control for classification errors and the possible effects of extraneous variables, it also limits the generality of the findings. The results of my analysis cannot be generalized to my total test population.

The results of the analysis which I will report in this chapter are for groups of extremely open or extremely closed minded subjects who were drawn from the total test population. A total of 259 Ss were selected from their respective school-grade distributions as high on dogmatism (close-minded). A total of 258 Ss were selected from their respective school-grade distributions as low on dogmatism (open minded). I have not computed the mean scores for these extreme groups since individual scores from different schools and/or grades are not comparable. The mean dogmatism scores of subgroups in the preliminary analysis appear as Table 1 in Appendix IV.

In chapter two, I hypothesized that the expert power of a source of information would have a significant main effect on the initial stage of an individual's decision making process, irrespective of the open or closedness of the individual's belief system (Hypotheses I). This hypothesis was tested in all reinforcement conditions of the TPG experiment. A total of 218 Ss participated in the three reinforcement conditions of the TPG experiment. The analysis of the S's response on Trial 1 shows that both open and closed minded persons are equally willing to accept and act on information from an authority. On the first trial of the TPG experiment, 98.01% of all subjects who received the information from the authority chose the response alternative which was suggested by the authority's information, whereas only 55.14% of all subjects who did not receive the authority's information chose this response alternative (Table 4.1). This difference between treatment and control conditions is highly significant ($t = 8.57$; $p \ll .001$).

Hypothesis II concerns the effects of expert power and dogmatism on the analysis stage of individual decision making. I hypothesized a joint or interactive effect for expert power and dogmatism: Closed minded persons who use information from an authority will complete the analysis stage at a later point in their decision making process than will open minded persons who do not use information from an authority. This hypothesis was tested in the TPG and PI experiments. Of the 218 Ss who participated in the three reinforcement conditions of the TPG experiment, only two did not complete the analysis stage of their decision making process, i.e. make at least one response which is consistent with the information provided by the choices of the other player. The two subjects who did not reach the criterion for the completion of the analysis stage of decision making had been assigned to the reinforcement condition II and are excluded from the analysis in Table 4.2-2.

Tables 4.2-1 through 4.2-3 present the summaries of analyses of variance which were computed to determine the effects of dogmatism and expert power on the analysis stage of decision making.[1]

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[1] The computational procedures for my analysis are described in B. J. Winer. 1962. Statistical principles in experimental design. New York: McGraw-Hill. Winer describes two different sets of procedures for the analysis of data from a factorial design with unequal cell frequencies. The two procedures are (1) are unweighted-means solution and (2) a least-squares solution. The unweighted-means solution is computationally less difficult but assumes that the unequal cell frequencies are not due to the factors of the design. For example, in Tables 4.2-1 through 4.2-3, the unequal cell frequencies could be due to either of the two

TABLE 4.1 PERCENTAGE OF OPEN AND CLOSED MINDED Ss WHO CHOSE RESPONSE "A" ON TRIAL 1 IN TREATMENT AND CONTROL CONDITIONS OF THE TPG EXPERIMENT. (REINFORCEMENT SCHEDULES I-III)

	Treatment	Control
Closed minded	97.77%	50.00%
	(45)[a]	(54)
Open minded	98.21%	55.14%
	(56)	(63)
TOTAL	98.01%	55.14%
	(101)	(117)

$t = 8.57$ $df = 206$
$p \ll .001$ (one-tailed)

[a] (n)

The analysis was performed separately for each reinforcement condition of the TPG experiment. Tables 4.2-1 through 4.2-3 present the results of three independent tests of Hypothesis II. The hypothesis of an interactive effect[2] of dogmatism and expert power on the analysis stage of decision making was not supported in any of the three independent tests. There is, however, a significant main effect of expert power in all three reinforcement conditions. The effect of expert power on the analysis phase of decision making is most pronounced under the reinforcement conditions (I and II) which most strongly negatively reinforce the response which is supported by the authority's information. The simple effect of expert power is that subjects who receive incorrect information about the relative frequencies of the other player's choices from a source who has expertness complete the analysis stage at a later point in their decision making process

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(footnote 1 continued from previous page)

factors. Either the level of dogmatism or the experimental treatment could so severely impair an individual's decision making process that he would be unable to complete the mental activities in the analysis stage. While this could be the case, the unequal cell frequencies in Tables 4.2-1 through 4.2-3 are not due to either of the two experimental factors. Here the unequal cell frequencies are simply due to the logistic difficulties of conducting field experiments. I used the computational procedures for the unweighted-means solution whenever the unequal cell frequencies were not due to the experimental variables. If the caption of a table does not indicate otherwise, the unweighted-means solution was used for the analysis of variance. Whenever the unequal cell frequencies are related to the experimental factors, the least-square solution to the analysis of variance was used. When the least-squares computational procedures are used, I have indicated this in the caption of the table.

[2] "...an effect attributable to the combination of variables above and beyond that which can be predicted from the variables separately." (Winer, 1962, p. 140).

TABLE 4.2-1 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE I).

Source	SS	df	MS	F	$p<$
Dogmatism (D)	.65	1	.65		
Expert Power (EP)	340.95	1	340.95	59.50	.001
D X EP	2.16	1	2.16		
Error (w. cell)	481.26	84	5.73		

Subgroup Means

	Treatment	Control
Dogmatism		
Closed	5.89 (4.04)[a] (19)[b]	2.26 (1.75) (27)
Open	6.36 (4.13) (22)	2.05 (1.60) (20)

[a] (s)

[b] (n)

TABLE 4.2-2 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE II).

Source	SS	df	MS	F	p<
Dogmatism	0	1	0		
Expert Power	482.80	1	482.80	71.00	.001
D X EP	12.07	1	12.07	1.77	.25
Error (w. cell)	469.22	69	6.8		

Subgroup Means

Dogmatism	Treatment	Control
Closed	7.47 (5.01)[a] (17)[b]	1.43 (.62) (14)
Open	6.67 (4.18) (21)	2.28 (1.58) (21)

[a] (s)
[b] (n)

TABLE 4.2-3 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE III).

Source	SS	df	MS	F	p<
Dogmatism	4.68	1	4.68		
Expert Power	151.85	1	151.85	4.35	.05
D X EP	88.46	1	88.46	2.53	.25
Error (w. cell)	1,779.83	51	34.90		

Subgroup Means

Dogmatism	Treatment	Control
Closed	7.88 (5.69)[a] (8)[b]	1.85 (.76) (13)
Open	4.67 (2.16) (12)	3.83 (8.14) (22)

[a] (s)

[b] (n)

than subjects who do not receive the authority's information. The absence of an interactive effect of expert power and dogmatism suggest that closed minded persons are not more susceptable to informational social influence during the analysis stage of their decision making than are open minded persons. Such equal susceptability of open and closed minded persons is shown by two of the subgroup means in each table (Tables 4.2-1 through 4.2-3). For example, in Table 4.2-1, the average trial number on which closed minded Ss in the treatment condition made the response which is consistent with the other player's choices is 5.89 while the corresponding figure for open minded persons in the treatment condition is 6.36. The absence of a significant main effect of dogmatism suggests that open and closed minded persons do not differ in the capacity to perform in the analysis stage of decision making. None of the tests from the TPG experiment support Hypothesis II.

The PI experiment provides two more independent tests of Hypothesis II. The two tests from the PI experiment also do not support Hypothesis II. In the PI experiment, Ss who took the pro position on the issue of staying and fighting in Vietnam find that in the treatment condition the authority supports their own position. The case of Ss who take the pro position in the PI experiment is analogous to the case of all Ss in the TPG experiment. In both cases, the information about the authority's beliefs positively reinforces the S's own beliefs and both the authority's and the S's beliefs are negatively reinforced by the new information. In the PI experiment, Ss who take the con position find that in the treatment condition the authority holds the opposite position. The case of Ss who take the con position in the Pi experiment is not strictly analogous to the case of Ss in the TPG experiment. While the beliefs of Ss who take the con position are still negatively reinforced by the new information, this new information postively reinforces the authority's beliefs.

Hypothesis II is tested in its original form by the analysis which is summarized in Table 4.3-1. This summary presents the results of an analysis of variance of the trial number on which Ss who took the pro position in the PI experiment completed the analysis stage of their decision making process. Table 4.3-1 shows that no effect reached an acceptable level of significance and no support was found for the hypothesis. The absence of a significant interactive effect of expert power and dogmatism is suggested by the subgroup means of Table 4.3-1. The average trial number on which closed minded persons in the treatment condition chose an alternative response[1] which is consistent with the new information is 2.86 while the corresponding figure for open minded persons in the control condition is 3.47. Corresponding figures for closed minded Ss (control condition) and open minded Ss (treatment condition) are 3.20 and 3.70, respectively.

Hypothesis II is tested in a modified form by the analysis which is summarized in Table 4.3-2. This second summary presents the results of an analysis of variance of the trial number at which Ss who took the con position in the PI experiment completed the analysis stage of their decision making process. Stated in a modified form, Hypothesis II is that the interactive effect of dogmatism and expert power is such that closed minded persons who refuse to use information from the

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[1] Either the "uncertain" or the change of position response.

TABLE 4.3-1 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. PI EXPERIMENT (PRO POSITION). LEAST-SQUARES SOLUTION

Source	SS	df	MS	F	p
Dogmatism	18.68	1	18.68	--	
Expert Power	.24	1	.24		
D X EP	5.08	1	5.08		
Error (w. cell)	1,798.47	248	725.19		

Subgroup Means

Dogmatism	Treatment	Control
Closed	2.86 (2.44)[a] (58)[b]	3.20 (2.37) (73)
Open	3.70 (3.11) (66)	3.47 (2.72) (55)

[a] (s)

[b] (n)

TABLE 4.3-2 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. PI EXPERIMENT (CON POSITION). LEAST-SQUARES SOLUTION

Source	SS	df	MS	F	p<
Dogmatism	1.34	1	1.34	1.03	--
Expert Power	4.74	1	4.74	3.65	.10
D X EP	.43	1	.43		
Error (w. cell)	116.99	90	1.30		

Subgroup Means

Dogmatism	Treatment	Control
Closed	1.59 (.96)[a] (29)[b]	1.26 (.67) (23)
Open	1.95 (1.72) (22)	1.35 .73 (20)

[a] (s)

[b] (n)

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authority with whom they disagree will complete the analysis stage at a later point in their decision making process than will open minded persons who are not presented with information from such an authority. While Table 4.3-2 indicates that there is a slight effect of expert power, no effect reaches an acceptable level of significance and Hypothesis II is not supported by the data. The absence of an interactive effect is shown in a subgroup means of Table 4.3-2. The average trial number of which closed minded persons in the treatment condition chose a response alternative which is consistent with the new information and with the authority's information is 1.59 while the corresponding figure for open minded persons in the control condition is 1.35. Corresponding averages for closed minded Ss (control) and open minded Ss (treatment) are 1.26 and 1.95, respectively.

Hypothesis III concerns the effects of expert power and dogmatism on the synthesis stage of individual decision making. I hypothesized a joint or interactive effect for expert power and dogmatism: Closed minded persons who use information from an authority will complete the synthesis stage at a later point in their decision making process than will open minded persons who do not use information from an authority. This hypothesis was tested in the TPG and PI experiments. Of the 218 Ss who participated in the TPG experiment, twenty-two did not complete the synthesis stage of their decision making process, i.e. make at least ten consecutive responses which are consistent with the information provided by the choices of the other player. Of the twenty-two Ss who did not complete the synthesis stage, five had been assigned to reinforcement condition I, ten to reinforcement condition II, and seven to reinforcement condition III. These twenty-two Ss are excluded from the analyses which are summarized in Tables 4.4-1 through 4.4-3a.

Tables 4.4-1 through 4.4-3a present the summaries of analyses of variance which were computed to determine the effects of dogmatism and expert power on the analysis stage of individual decision making. The analysis was performed separately for each reinforcement condition of the TPG experiment. Tables 4.4-1 through 4.4-3a present the results of three independent tests of Hypothesis III. The hypothesis of an interactive effect of dogmatism and expert power on the synthesis stage of individual decision making was not supported by any of the three independent tests. In addition, neither the simple effect of dogmatism nor the simple effect of expert power reached an acceptable level of significance. While Table 4.4-1 indicates that there is a slight simple effect of dogmatism, the results of Tables 4.4-1 through 4.4-3a do not support Hypothesis III.

The unweighted-means solution for an analysis of variance with unequal cell frequencies was used throughout Tables 4.4-1, 4.4-2, and 4.4-3a. As was mentioned above, this computational procedure assumes that the unequal frequencies in the cells of the design are not due to the experimental variables. The percentages of subjects who met the criterion for completion of the synthesis stage under the various reinforcement conditions suggested that this assumption might not be warranted. Under reinforcement condition III, the percentage of Ss who completed the synthesis stage were quite different for each of the four cells of the design. The uneven drop-off under reinforcement condition III suggested that open minded Ss in both treatment and

TABLE 4.4-1 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE I).

Source	SS	df	MS	F	$p <$
Dogmatism	743.01	1	743.01	3.82	.10
Expert Power	22.94	1	22.94		
D X E	250.41	1	250.41	1.29	--
Error (w. cell)	15,360.41	79	194.44		

Subgroup Means

Dogmatism	Treatment	Control
Closed	19.56 (18.36)[a] (18)	15.00 (10.88) (24)
Open	10.04 (5.01) (22)	12.47 (7.45) (19)

[a] (s)

[b] (n)

TABLE 4.4-2 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE II).

Source	SS	df	MS	F	p<
Dogmatism	38.30	1	38.30		
Expert Power	68.31	1	68.31		
D X E	415.12	1	412.12	1.46	.25
Error (w. cell)	17,388.03	61	285.05		

Subgroup Means

Dogmatism	Treatment	Control
Closed	29.12 (15.76)[a] (16)	32.15 (21.29) (13)
Open	32.67 (16.43) (18)	25.50 (12.17) (18)

[a] (s)

[b] (n)

TABLE 4.4-3a ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE III).

Source	SS	df	MS	F	p<
Dogmatism	217.78	1	217.78		
Expert Power	52.80	1	52.80		
D X E	797.58	1	797.58	1.70	.25
Error (w. cell)	20,673.42	44	469.85		

Subgroup Means

Dogmatism	Treatment	Control
Closed	42.57 (9.72)[a] (7)[b]	36.15 (19.25) (13)
Open	29.40 (15.00) (10)	40.28 (26.76) (18)

[a] (s)

[b] (n)

control conditions were less successful in completing the synthesis stage than were closed minded Ss in both conditions (Table 4.4-3b). However, a statistical test indicated that there was no significant difference between open and closed minded persons in this regard.

The PI experiment provides two more independent tests of Hypothesis III. The results of the two tests from the PI experiment also do not support Hypothesis III. This hypothesis is tested in its original form by the analysis which is summarized in Table 4.5-1. This summary presents the results of an analysis of variance[1] of the trial number on which Ss who took the pro position in the PI experiment completed the synthesis stage of their decision making process. Table 4.5-1 shows that no effect reached an acceptable level of significance and no support was found for the hypothesis. The absence of a significant interactive effect of expert power and dogmatism is suggested by the subgroup means of Table 4.5-1. The average trial number on which closed minded persons in the treatment condition choose the first of two consecutive alternative responses* which are consistent with the new information is 4.76 while the corresponding figure for open minded persons in the contril condition is 4.70. Corresponding figures for closed minded Ss (control condition) and open minded Ss (treatment condition) are 4.95 and 5.53, respectively. Hypothesis III is tested

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[1] Marked differences in the percentages of Ss who, in each cell of the design, reached the criterion measure suggested that the least-squares solution for the analysis of variance would be more appropriate than the unweighted-means solution.

* Two consecutive change of position responses only.

TABLE 4.4-3b PERCENTAGE OF CLOSED AND OPEN MINDED Ss WHO REACHED THE CRITERION MEASURE OF COMPLETION OF THE SYNTHESIS STAGE OF DECISION MAKING. TREATMENT AND CONTROL CONDITIONS OF THE TPG EXPERIMENT (REINFORCEMENT SCHEDULE III).

	Closed	Open
Treatment	87.50% (8)[a]	83.33% (12)
Control	100.00% (13)	81.82% (22)
TOTAL	95.00% (21)	82.35% (34)

t = 1.60 df = 53

p = n.s. (two-tailed)

[a] (n)

TABLE 4.5-1 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. PI EXPERIMENT (PRO POSITION). LEAST-SQUARES SOLUTION

Source	SS	df	MS	F	p
Dogmatism	4.65	1	4.65	.37	--
Expert Power	3.82	1	3.82		
D X EP	1.02	1	1.02		
Error (w. cell)	756.78	61	12.41		

Subgroup Means

	Treatment	Control
Dogmatism		
Closed	4.76 (3.60)[a] (17)[b]	4.95 (3.25) (19)
Open	5.53 (3.45) (19)	4.70 (3.32) (10)

[a] (s)

[b] (n)

in a modified form by the analysis which is summarized by Table 4.5-2. This second summary presents the results of an analysis of variance of the trial number on which Ss who took the con position in the PI experiment completed the synthesis stage of their decision making process. Stated in a modified form, Hypothesis III is that the interactive effect of dogmatism and expert power is such that closed minded persons who refuse to use information from an authority with whom they disagree will complete the synthesis stage at a later point in their decision making process than will open minded persons who are not presented with information from such an authority. Table 4.5-2 shows that no effect reached an acceptable level of significance and the hypothesis was not supported by the data. The absence of an interactive effect is shown by the subgroup means of Table 4.5-2. The average trial number on which closed minded persons in the treatment condition chose the first of two consecutive alternative responses* which are consistent with the new information and with the authority's information is 2.21 while the corresponding figure for open minded persons in the control condition is 2.60. Corresponding figures for closed minded Ss (control condition) and open minded Ss (treatment condition) are 2.54 and 3.33, respectively.

In conclusion, Hypothesis I was supported by the data. Hypotheses II and III were not supported by any of the various tests. A significant main effect of expert power on the analysis stage of individual decision making was found for all three reinforcement conditions of the TPG experiment.

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* Two consecutive change of position responses only.

TABLE 4.5-2 ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. PI EXPERIMENT (CON POSITION). LEAST-SQUARES SOLUTION

Source	SS	df	MS	F	p
Dogmatism	3.85	1	3.85	.69	--
Expert Power	.20	1	.20		
D X EP	3.02	1	3.02		
Error (w. cell)	223.49	40	5.59		

Subgroup Means

Dogmatism	Treatment	Control
Closed	2.21 (1.87)[a] (14)[b]	2.54 (1.98) (11)
Open	3.33 (2.95) (9)	2.60 (2.33) (10)

[a] (s)

[b] (n)

CHAPTER V

Discussion

The results of the analysis which are reported in Chapter IV support Hypothesis I and fail to support Hypotheses II and III.

Hypothesis I is tested only in the Two-Person Game experiment. The results of this test are summarized in Table 4.1. Table 4.1 shows that the treatment condition of the TPG experiment has an equal effect on open and closed minded persons. An hypothesized, subjects who received the information from the authority about the expected frequencies of the other player's choices (treatment condition) chose, on the first trial of the game, the response alternative which was supported by that information while subjects who did not receive the information did not, as a group, show a response preference on the first trial of the game. The analysis of S responses on the first trial of the TPG experiment showed that 98.01% of all subjects in the treatment condition chose the response which was supported by the authority's information (Response B) while only 55.14% of all subjects in the control condition made this choice on the first trial.

Subjects in the control condition of the TPG experiment can only rely on their intuition to guide their choice on the first trial of the game. The pay-off values which I assigned to the cells of the game matrix were chosen because they suggested that Response B would be the more rewarding choice (see Figure 3.1 on page 92). The responses of subjects in the control condition indicate that only a slight majority of such subjects (55.14%) perceived the matrix in this way.

This finding seems to indicate that a great many subjects simply did not, at least initially, understand the game.

However, fairly equal percentages of open and closed minded persons in the control condition did perceive that Response B was likely to be more rewarding than Response A. On the first trial, 55.14% of the open minded subjects and 50.00% of the closed minded subjects in the control condition chose the response (B) which was suggested by the pay-off values of the game matrix. Open and closed minded persons also do not seem to differ in their ability to understand the nature of this simple task and to act accordingly.

Subjects in the treatment condition of the TPG experiment are able to rely on their intuition and on the information of an authority to guide their choice on the first trial of the game. The authority's information helps to resolve the subject's uncertainty about how he should initially choose. In the first place, the authority's information is likely to be consistent with the subject's own intuition. In the second place, the information comes from a person whom the subject is likely to believe has expert power, i.e., the experimenter, as the person who supposedly developed the game, has special knowledge which is unique to the subject's task and does not appear to be giving the subject the information in order to manipulate him. Such information is the best available to subjects in the treatment condition and as a group (98.01%) they choose in accordance with the authority's information. Furthermore, open and closed minded subjects in the treatment condition do not differ in their willingness to initially choose on the basis of information which is provided by a source who is believed by the subject to have expert power. On the first trial, 98.21% of the open minded subjects and 97.77% of the closed minded subjects in the treatment condition chose the response (B) which was supported by the authority's information. While the analysis of subject choices which are made after the first trial of the TPG experiment do not support Hypotheses II and III, the analysis of such choices does indicate that a source's expert power continues to affect an individual's decision making process beyond the initial stage of that process.

Hypothesis II is tested in the Two-Person Game experiment and in the Political Issue experiment. The results of tests of the hypothesis in the TPG experiment are summarized separately for each of the three reinforcement conditions in Tables 4.2-1, 4.2-2, and 4.2-3. Hypothesis II is not supported by any of the three tests. I had hypothesized an interactive effect of expert power and dogmatism on the point at which individuals complete the analysis stage of their decision making: Closed minded persons who are exposed to information from an authority will complete the analysis stage at a later point in their decision making process than will open minded persons who are not exposed to information from an authority. While no interactive effect was found for any of the three reinforcement conditions, the perceived expert power of the source of information did have a significant main effect on the decision making processes of subjects in all three reinforcement conditions. The significant main effect of expert power is such that all subjects (both open and closed minded) in the treatment condition of the TPG experiment completed the analysis stage at a later point in their decision making process than did subjects (both open and closed minded) in the control condition. The perceived expert power of the information source had a continued effect on the decision making processes of subjects in the treatment condition. This continued effect made subjects in the treatment condition less willing to accept and act on the information about the actual frequencies with which the other player was making his choices (information which came directly to the subject as a consequence of his own actions) and more willing to rely on the authority's information (even though the use of such information was being negatively rewarded). This continued effect of expert power is such that subjects who are exposed to it tend, on the average, to first choose Response A later in the course of the game than do subjects who are not exposed to it. Finally, this continued effect of expert power holds for both open and closed minded persons.

The literature on dogmatism states that open and closed minded persons do not differ in their respective abilities to use analytical thinking. On this theoretical basis I expected that open and closed minded persons would not differ in the point at which they would complete the analysis stage of their decision making in the Two-Person Game experiment. This expectation is supported by the results which are summarized in Tables 4.2-1, 4.2-2, and 4.2-3. The analyses presented in these tables show that dogmatism did not have a significant main effect on the point at which subjects completed the analysis stage of their decision making process in the TPG experiment.

However, in Chapter II I presented an alternative theoretical basis which is also in the literature on dogmatism for hypothesizing that some factors have a different effect on the analytical thinking process of open minded persons than they do on the analytical thinking processes of closed minded persons. This alternative theoretical basis is that open minded persons view the world as less threatening than do closed minded persons. One consequence of this difference is that open minded persons are less likely to rely passively on an authority's information than are closed minded persons who find security in passively accepting and using information from an authority (Restle, Andrews, and Rokeach, 1964).

This theoretical and empirical difference between open and closed minded persons suggested that, in the treatment condition of the TPG experiment, open minded persons would tend to discount the authority's information as they received information from their own senses which contradicted the authority's. Closed minded persons, it seemed to me, could on the other hand be expected to discount the contradictory information while continuing to rely on the authority and use his information. I thought that such a difference would be reflected in the point at which open and closed minded persons, in the treatment condition of the TPG experiment, would complete the analysis stage of their decision making process, i.e., first chose the response (A) which is inconsistent with the belief supported by their intuition and by the authority's information. Since no such difference is shown in Tables 4.2-1 through 4.2-3, I can only conclude that, even if open and closed minded persons do differ in how they rely on and use information from an authority, such a difference is not reflected in their respective abilities to use analytical thinking in the treatment condition of the TPG experiment.

Hypothesis II is also tested in the Political Issue experiment. The results of tests of the hypothesis in the PI experiment are summarized separately for each position (pro and con) which the subject may have initially taken on the issue. These results are summarized in Tables 4.3-1 and 4.3-2. Hypothesis II is tested in its original form by the analyses of the responses of subjects who initially took the pro position on the issue of staying and fighting in Viet Nam. In this case, the treatment condition of the PI experiment is strictly analogous with the treatment and control conditions of the TPG experiment. In the treatment condition, Ss receive information which supports their own beliefs and which is contradicted by the new information which they receive in the course of the experiment. The analyses which is summarized in Table 4.3-1 shows that there is no significant interactive effect of expert power and dogmatism on the measure of completion of the analysis stage of decision making for Ss who took pro position in the PI experiment. Furthermore, neither expert power nor dogmatism has a significant main effect on completion of the analysis stage. This finding contrasts with the case of the TPG experiment in which the factor of perceived expert power did have the significant main effect of retarding completion of the analysis stage of individual decision making.

This discrepancy between findings in the TPG and PI experiments can be attributed to some rather obvious differences between the two experiments. In the first place, the expert power of the source of information in the TPG experiment is carefully established for the subject. In the TPG experiment, this factor is actively manipulated to insure that the subject perceives the source in these terms. The factor of expert power is not actively manipulated in the PI experiment. The source of information for the PI experiment (the

President of the United States) is one for whom the subject already has certain (probably strong) beliefs. Some of these subject beliefs may involve perceptions of expert power but other beliefs may not. In effect, the strength of the factor of expert power in the PI experiment is probably less than it is in the TPG experiment. In the second place, subjects in the PI experiment are probably unwilling to replace currently held beliefs because of the intensity with which they hold those beliefs and not just because their currently held beliefs are supported by information from the authority.

Hypothesis II is tested in a modified form by the analysis of the responses of subjects who initially took the con position on the issue of staying and fighting in Viet Nam. In this case the treatment condition of the PI experiment is _not_ strictly analogous with the treatment condition of the TPG experiment. In the treatment condition of the PI experiment, subjects receive information from the authority which contradicts their own beliefs but which _is_ consistent with the new information which they receive in the course of the experiment. Stated in a modified form for this case of the PI experiment, _Hypothesis II_ is that the interactive effect of expert power and dogmatism is such that closed minded persons who refuse to use information from an authority with whom they disagree will complete the analysis stage at a later point in their decision making process than will open minded persons who are not presented with information from such an authority. The analysis which is summarized in Table 4.3-2 shows that there is no significant interactive effect of expert power and dogmatism on the measure of completion of the analysis stage of decision making for Ss who took the con position in the PI experiment. Furthermore, neither expert power nor dogmatism has a significant main effect on completion of the analysis stage. I suspect that the discrepancy between this finding and findings for the TPG experiment is due to the same factors which I discussed above: (1) expert power in the PI experiment is probably a rather weak factor, and (2) individuals probably feel very intense about their beliefs and would be equally unwilling to change them even if the expert power of the source were made stronger. While I have said that no effect in Table 4.3-2 reaches an acceptable level of significance, there is one suggestive finding.

The summary of results of the analysis of Table 4.3-2 indicates that expert power does have a substantial effect ($p<.10$) on the measure of completion of the analysis stage of decision making. The subgroup means of Table 4.3-2 indicate that the effect of expert power is such that subjects in the treatment condition are less willing to change their position on the issue (where change is in the direction of the authority's position) than are subjects in the control condition. Subjects in the treatment condition who received information from a source with whom they disagreed tended to complete the analysis stage at a later point in their decision making process than did subjects who were not exposed to such information. However, as I have said, this effect of expert power did not reach an acceptable level of significance. Nevertheless, it is interesting that this effect seems to hold equally well for both open and closed minded persons.

It is also interesting that the expert power of the source had an effect in the case of subjects who initially took the con position on the Viet Name issue but did not have an effect in the case of subjects who initially took the pro position. Subjects who initially took the pro position did not tend to stick with their position longer because it was supported by the authority than they would have otherwise. The reverse is true for subjects who took the con position, i.e., such subjects did tend to stick with their position longer because it was opposed by the authority than they would have otherwise. This contrast would lead one to the conclusion that persons who take the con position on the Viet Nam issue are, in part, unwilling to change their position because some political authorities hold the contrasting position. The above contrast would lead to this conclusion if the effect of expert power in Table 4.3-2 were significant -- but it isn't.

Hypothesis III is tested in the TPG experiment and in the PI experiment. The results of tests of the hypothesis in the TPG experiment are summarized separately for each of the three reinforcement conditions in Tables 4.4-1, 4.4-2, and 4.4-3. Hypothesis III is not supported by any of the three tests. I had hypothesized an interactive effect of expert power and dogmatism on the point at which individuals complete the synthesis stage of their decision making: Closed minded persons who are exposed to information from an authority will complete the synthesis stage at a later point in their decision making process than will open minded persons who are not exposed to information from an authority. While no significant interactive effect was found for any of the three reinforcement conditions of the TPG experiment, the simple main effect of dogmatism did approach significance in one of the three tests. As Table 4.4-1 indicates, closed minded persons on the whole tended to complete the synthesis stage at a later point in their decision making process than did open minded persons. However, as I have stated above, this effect did not reach an acceptable level of significance.

The results of tests of Hypothesis III in both conditions of the PI experiment are equally non-significant. Hypothesis III is tested in its original form by the analysis of the responses of subjects who initially took the pro position on the issue of staying and fighting in Viet Nam (Table 4.5-1). Hypothesis III is tested in a modified form by the analysis of the responses of subjects who initially took the con position on the Viet Nam issue (Table 4.5-2). In both cases, the hypothesized interactive effect did not reach an acceptable level of significance. In addition, no main effect reached an acceptable level of significance in either case.

My inability to support Hypothesis III is as interesting as it is disturbing. The lack of support for Hypothesis III is interesting because of what it suggests about when individuals become independent of the expert power of a source of information. While the literature on expert power is not addressed to this question, I had thought that individuals would not become completely independent of the effects of expert power until after they had completed the synthesis stage of their decision making process. It seemed to me that an individual would be completely free of an authority only when he committed himself to a course of action which was not supported by the authority's information. I had thought that the measure of completion of the synthesis stage (in the TPG experiment -- the trial number of the first of ten consecutive responses which are not supported by the authority's information) would indicate when the individual had become completely independent of the effects of the source. While it may be true that Ss in the treatment condition of the TPG and PI experiments are not completely independent of the effects of the source until completion of the synthesis stage, the point at which such subjects complete the synthesis stage is not significantly later than is the point at which subjects in the control condition complete the synthesis stage of their decision making processes.

The results of my various tests of Hypotheses I, II, and III suggest some interesting conclusions on the nature of the effects of expert power on an individual's decision making process. Decision making situations are characterized by individual uncertainty of judgement -- uncertainty about which alternative response will lead to more rewarding consequences. In such situations it is logical that individuals would use all available information in an attempt to resolve that uncertainty which they experience as they are about to make their first choice. Under such conditions, all individuals are equally willing to (1) accept information from a source whom they believe has expert power, and (2) make their first choice on the basis of such information. While such behavior may be logical, it also has certain adverse consequences for the individual. The acceptance and use of such information is accompanied by a commitment to it. Individuals who accept and use such information are less willing to accept and use other information which contradicts the authority's information than are individuals who are not exposed to the authority's information and who therefore do not base their choices on it. In the pre-analysis stage of their decision making processes, individuals tend to rely passively on an authority's information and are not active in integrating contradictory information -- even when they acquire the contradictory information directly. It would be interesting to determine what such individuals would do if a new authority (i.e., one whom the subject believed also had expert power) provided such contradictory information.

All individuals, irrespective of level of dogmatism, are quite susceptible to informational social influence in the pre-analysis phase of their decision making processes. Individuals are less susceptible to such influence as they discover for themselves the objective nature of a decision making situation. Individuals are able to discover the objective nature of a decision making situation, and therefore free themselves of the effects of the expert power of a source of information, before they reach the synthesis stage of their decision making process. In fact, it is probably true that individuals are unable to perform synthesizing mental activities until they have modified a source's information to fit their own particular situation and/or until they have discovered for themselves the objective basis (or lack thereof) of a source's expert power. The results of this study indicate that all subjects, irrespective of level of dogmatism, free themselves of the effects of the expert power of a source as they complete the analysis stage of their decision making, i.e. as they first choose a response alternative which is contradicted by the authority but supported by their own senses. Individuals in the post-analysis stage of their decision making processes do not seem to be susceptible to informational social influence.

The results of my various tests of Hypotheses II and III are perhaps more disturbing than they are interesting. The clearest finding of this study is that the hypothesized interactive effects of expert power and dogmatism are not significant. The above discussion presents an alternative theoretical view to account for the observed effects of expert power. This discussion does not however account for the absence of any effects of dogmatism. It is also easier to account for the fact that dogmatism did not enter into an interactive effect with expert power on the measures of analysis and synthesis than it is to explain why open and closed minded persons did not differ in their ability to synthesize in the TPG and PI experiments.

As I have suggested elsewhere (Chapter IV) the basic equality between the abilities of open and closed minded persons to analyze was not altered by a greater tendency of closed minded persons to rely passively on the authority in the pre-analysis stage of their decision making. Furthermore, the theoretical basis for hypothesizing an interactive effect between expert power and dogmatism on the measures of synthesis is not very strong. This theoretical basis was that since open and closed minded persons do differ in their ability to distinguish between information from a source and personal beliefs about the source, they would also differ in how passively they would continue to rely on and use information from an authority. This theoretical basis suggested that, even after the authority's information had been invalidated, closed minded persons would retain their positive evaluation of the source whereas open minded persons would not. While this effect may have occurred it was not strong enough to visably affect the point at which individuals completed the synthesis stage of their decision making process. However, the theoretical basis for believing that open and closed minded persons would nevertheless differ in their ability to engage in synthesizing mental activities is much stronger.

The absence of any significant effect of dogmatism on the point at which individuals complete the synthesis phase of their decision making processes cannot be unambiguously explained. There are adequate empirical grounds for believing that, in some situations, open minded persons perform better in problem-solving situations which require the use of synthesis than do closed minded persons. In general, the nature of such situations is that they require the integration of information which itself is unusually, i.e. tends to contradict the subject's common, everyday beliefs about reality. Perhaps subjects in the TPG and PI experiments did not view the new information as completely at odds with their original beliefs and therefore did not experience any difficulty in integrating such information into their present belief systems. It is also possible that the measures of synthesis for the TPG and PI experiments are invalid. While my operational measures of synthesis are consistent with my conceptual definition of synthesis (Chapter II), these measures may not be psychologically meaningful. It may also be that synthesizing mental activities are in fact not required to solve the decision making problems in the TPG and PI experiments. It may be that, in the TPG experiment, the distinction between a choice and a decision is only a logical one -- at least in the case where subjects are only chosing from a set of two specified alternative responses. In the PI experiment, subjects may come to adopt the opposite position for two consecutive trials simply out of a desire to conform with the opinions of others and not because they have actually synthesized new information. In short, there does not seem to be any unambiguous interpretation which can be made of this study's lack of significant results.

The ambiguity which surrounds the result of this study can only be resolved by further research. I think that the following lines of research would probably be most rewarding:

> (1) An effort must be made to refine the measure of dogmatism. As the measure stands now (Form E), the low test - retest reliability coefficients indicate that the test lacks internal consistency. The measure should be refined in one of two ways: (a) since the measure may reflect several underlying dimensions (Rokeach, 1960), the predictive validity of scale questions which tap each dimension should be established; (b) if the measure does not reflect underlying dimensions, then a greater effort should be made to increase the internal consistency (and test - retest reliability of the dogmatism scale.
>
> (2) If one had an internally consistent and reliable measure of dogmatism, a modified version of the TPG experiment should be used to retest the hypotheses which were made in this study. The most important modifications in the TPG experiment would be to increase the number of alternative responses to at least three, increase the length of the game, and complicate the reinforcement schedule. In this way, subjects could maximize their rewards only by synthesizing a large set of information in order to learn the underlying strategy.
>
> (3) Perhaps the most important task which now faces this author is to better conceptualize the nature of an individual's decision making process. Since the subjects of this study are seldom "open or closed minded" but rather just individuals, I intend to let their responses to the TPG and PI experiments guide my conceptualization.

LIST OF REFERENCES

Berkowitz, L. (Ed.) *Advances in Experimental Social Psychology*. New York: Academic Press. 1965.

Cartwright, D. (Ed.) *Studies in Social Power*. Ann Arbor, Mich: Institute for Social Research. 1959.

Christensen, C. M. "A Note on "Dogmatism and Learning."" *J. abnorm. soc. Psychol*., *62*, 75-76, 1963.

Costin, F. "Dogmatism and Learning: A Follow-up of Contradictory Findings." *J. Ed. Research*, 59, 186-188. 1965.

Croner, M. D. and Willis, R. H. Perceived differences in task competence and asymmetry of dyadic influence. *J. abnorm. soc. Psychol*., *62*, 705-708. 1961.

Crutchfield, R. S. Conformity and Character. *Amer. Psychologist*, *10*, 191-198. 1955.

Deutsch, M. and Gerard, H. B. "A Study of Normative and Informational Social Influences upon Individual Judgement. *J. abnorm. soc*. *Psychol*., *51*, 629-636. 1955.

Ehrlich, H. "Dogmatism and Learning: A Five-year Follow-up." *Psychol*. *Reports*, *9*, 283-286. 1961.

Fillenbaum, S. and Jackman, A. "Dogmatism and Anxiety in Relation to Problem Solving: An Extension of Rokeach's Results." *J. abnorm*. *soc. Psychol*., *63*, 212-214. 1961.

French, J.R.P., Jr., and Raven, B. H. "The Bases of Social Power." In D. Cartwright (Ed.) *Studies in Social Power*. Ann Arbor, Mich.: Institute for Social Research, pp. 150-167. 1959.

Hollander, E.P., and Hunt, R.G. (Eds.) *Current Perspectives in Social Psychology*. New York: Oxford University Press. 1963.

Katz, D., and Stotland, E. A preliminary statement to a Theory of attitude structure and change. In S. Koch. (Ed.) *Psychology: A study of science*. Vol. 3. New York: McGraw-Hill. 1959.

Kelley, H. H., and Lamb, T. W. "Certainty of Judgement and Resistance to Social Influence." *J. abnorm. soc. Psychol*., *55*, 137-139. 1957.

LIST OF REFERENCES, CONTINUED.

Kelman, H. C. "Three Processes of Social Influence." In E. P. Hollander and R. G. Hunt (Eds.) Current Perspectives in Social Psychology. New York: Oxford University Press, 1963. Pp. 454-462. 1961.

Kleck, R. E., And Wheaton. "Dogmatism and Responses to Opinion-Inconsistent Information." J. pers. soc. Psychol., 5, 249-252. 1967.

Kohler, W. The place of value in a world of facts. New York: Liveright. 1938.

Leavitt, H. J. "Some Effects of Certain Communication Patterns on Group Performance." J. abnorm. soc. Psychol., 46, 38-50. 1951.

Osgood, C. E., Suci, G. J., and Tannenbaum, P. H. The Measurement of Meaning. Urbana, Ill.: University of Illinois Press. 1957.

Pannes, E. D. An Exploratory Study of the Relationship between Attitudes toward Self and the Degree Present in a Group of Junior-Senior High School Students. Unpublished doctoral dissertation. School of Education. New York University. 1962.

Powell, F. A. "Open and closed-Mindedness and the Ability to Differentiate Source and Message." J. abnorm. soc. Psychol., 65, 61-64. 1962.

Powell, F. A. "Latitudes of Acceptance and Rejection and the Belief-disbelief Dimension." J. pers. soc. Psychol., 4, 453-457. 1966.

Raven, B. H., and French, J. R. P., Jr. "Legitimate Power, Coercive Power and Observability in Social Influence," J. Pers., 26, 400-409. 1958.

Restle, F., Andrews, M., and Rokeach. M. "Differences between Open- and Closed-Minded Subjects on Learning Set and Oddity Problems." J. abnorm. soc. Psychol., 68, 648-654. 1964.

Riker, W. H. The theory of political coalitions. New Haven, Conn.: Yale University Press. 1962.

Rokeach, M. The Open and Closed Mind. New York: Basic Books. 1960.

Rokeach, M. "Authority, Authoritarianism, and Conformity." In I.A. Berg and B. M. Bass (Eds.), Conformity and Deviation. New York: Harper and Row. Pp. 230-257. 1961.

LIST OF REFERENCES, CONTINUED.

Schopler, J. "Social Power." In L. Berkowitz (Ed.), Advances in Experimental Social Psychology. New York: Academic Press. Pp. 177-218. 1965.

Siegel, S. Nonparametric Statistics. New York: McGraw-Hill. 1956.

Simon, H. A. Political research: The decision making framework. In D. Easton (Ed.) Varieties of political Theory. Englewood Cliffs, N.J.: Prentice-Hall. 1966. Pp. 15-24.

Snyder, R. C. A decision-making approach to the study of political phenomena. In R. Young (Ed.) Approaches to the study of politics. Evanston, Ill.: Northwestern University Press. 1958. Pp. 3-38.

Troldahl, V. C. and Powell, F. A. A short-form dogmatism scale for use in field studies. Social Forces. 44, 211-214. 1965.

Vidulich, R. N., and Kaiman, I. P. "The Effects of Information Source Status and Dogmatism upon conformity behavior." J. abnorm. soc. Psychol., 63, 639-642. 1961.

Walster, E. and Festinger, L. "The Effectiveness of 'Overheard' Persuasive Communications." J. abnorm. soc. Psychol., 65, 395-402. 1962.

Winer, B. J. Statistical Principles in Experimental Design. New York: Wiley. 1962.

Young, R. (Ed.) Approaches to the study of politics. Evanston, Ill.: Northwestern University Press. 1958.

APPENDIX I: Modified Dogmatism Scale (Form E), instructions and response scheme

INTRODUCTION

This is a study of what high school students think and feel about a number of important social and personal questions. The best answer to each statement below is your personal opinion. There are no "correct" or "incorrect" answers. Teachers and school officials will not know your opinions.

We have tried to cover many different and opposing points of view; you may find yourself disagreeing strongly with some, agreeing strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many people feel the same as you do.

First impressions are usually best in such matters. Read each statement and decide how much you agree or disagree with it. Read the items carefully, but work as quickly as possible.

INSTRUCTIONS AND RESPONSE SCHEME

Some of these statements may be hard for high school students to understand. Other students have helped us to change the words in some of these statements to make the meanings clearer. We have put the changes they made in brackets [like this] under the original statement. This has been done for 25 of the 40 statements in Section I. These changes are only to help you understand the statement better. The two statements which appear together do mean the same thing.

Mark each statement on your answer sheet depending on how much you disagree or agree with it. For each statement, use your black pencils to fill in one of the six boxes that are numbered -3, -2, -1, +1, +2, and +3. Do not use the other boxes. Do not write in this questionnaire. Here is how you use your answer sheet:

If you disagree very much -fill in the box under number -3
If you disagree on the whole -fill in the box under number -2
If you disagree a little -fill in the box under number -1

If you agree a little -fill in the box under number +1
If you agree on the whole -fill in the box under number +2
If you agree very much -fill in the box under number +3

Do this for every statement. Please do not skip any.

If you find that the numbers to be used in answering do not really indicate your own opinion, fill in the numbered box that is closest to the way you feel.

1. The United States and Russia have just about nothing in common.

2. The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.

   [The best kind of government is a democracy, and the best kind of democracy is a government run by those who are smartest]

3. Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.

   [All groups should be able to say what they believe in without anyone stopping them, but some political groups have to be limited in this freedom, although it is too bad to have to limit them]

4. It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.

   [It is only natural that a person would know much more about ideas he believes in than ideas he doesn't like at all]

5. Man on his own is a helpless and miserable creature.

6. Fundamentally, the world we live in is a pretty lonesome place.

   [Actually, the world we live in is a pretty lonesome place]

7. Most people just don't give a "damn" for others.

8. I'd like it if I could find someone who would tell me how to solve my personal problems.

9. It is only natural for a person to be rather fearful of the future.

10. There is so much to be done and so little time to do it in.

11. Once I get wound up in a heated discussion, I just can't stop.

12. In a discussion, I often find it necessary to repeat myself several times to make sure I'm being understood.

[In a discussion, I often have to say the same thing several times to make sure the others understand me]

13. In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.

[In a heated discussion I almost always think so hard about what I am going to say that I forget to listen to what the others are saying]

14. It is better to be a dead hero than to be a live coward.

15. While I don't like to admit this even to myself, my secret goal in life is to become a very great man, like Einstein, or Beethoven, or Shakespeare.

[While I don't like to say this even to myself, my secret goal in life is to become a very great man]

16. The main thing in life is for a person to want to do something important.

17. If given the chance, I would do something of great benefit to the world.

[If given the chance, I would do something of great help to the world]

18. In the history of mankind there have probably been just a handful of great thinkers.

19. There are a number of people I have come to hate because of the things they stand for.

20. A man who does not believe in some great cause has not really lived.

[A man who does not believe in something which can be of great help to the world has not really lived]

21. It is only when a person devotes himself to an ideal or cause that life becomes meaningful.

[Life takes on real meaning for a person only when he puts all of his effort into something which has a high purpose or which is important in this world]

22. Of all the different philosophies which exist in this world, there is probably only one which is correct.

[Probably only one of the different beliefs which there are in this world is right]

23. A person who gets enthusiastic about too many causes is likely to be a pretty "wishy-washy" sort of person.

[A person who gets interested and excited about too many things which are important in this world is likely to be someone who can't make up his mind]

24. To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.

[It is dangerous to give in, even a little, to people on the other side of the political fence, because this usually leads to the weakening or defeat of our own side]

25. When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.

[When it comes to differences of opinion in religion, we must be careful not to give and take with those whose beliefs are different from ours]

26. In times like these, a person must be pretty selfish if he considers primarily his own happiness.

[In times like these, a person must be pretty selfish if he puts his own happiness ahead of anything else]

27. The worst crime a person could commit is to attack publicly the people who believe in the same thing he does.

[The very worst thing a person could do is to openly attack the people who believe in the same thing he does]

28. In times like these it is often necessary to be more on guard against ideas put out by people or groups in one's own camp than by those in the opposing camp.

[In times like these, we often have to be more careful about dangerous ideas put out by people or groups on our side of the fence than by people on the other side of the fence]

29. A group which tolerates too much difference of opinion among its own members cannot exist for long.

[A group which allows too much difference of opinion among its own members cannot last long]

30. There are two kinds of people in this world: those who are for the truth and those who are against the truth.

31. My blood boils whenever a person stubbornly refuses to admit he's wrong.

[I get very angry when a person just won't admit he's wrong]

32. A person who thinks primarily of his own happiness is beneath contempt.

[A person who thinks first of his own happiness is about as low as anyone can get]

33. Most of the ideas which get printed nowadays aren't worth the paper they are printed on.

34. In this complicated world of ours, the only way we can know what's going on is to rely on leaders or experts who can be trusted.

[Since this world of ours is so hard to understand, the only way we can know what's going on is to depend on the leaders and those who know a lot, whom we can trust]

35. It is often desirable to reserve judgement about what's going on until one has had a chance to hear the opinions of those one respects.

[It is often better to wait until people you think a lot of have given their opinion before you make up your own mind about what's going on]

36. In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.

37. The present is all too often full of unhappiness. It is only the future that counts.

38. If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all."

[If a person is to reach his goal in life, he sometimes has to play an "all" or "nothing" kind of game]

39. Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what's going on.

[I think it's too bad, but lots of people I've talked to don't really understand about the important problems facing the world today or about what is right and what is wrong]

40. Most people just don't know what's good for them.

Appendix II. Political Issue Instrument

Issue: Stay and Fight in Viet Nam

Section I: Presentation of Pro Position and Determination of Subject Position

A. Treatment condition:

PRESIDENT JOHNSON BELIEVES VERY STRONGLY THAT THE UNITED STATES SHOULD STAY AND FIGHT IN VIET NAM UNTIL THE COMMUNISTS STOP TRYING TO TAKE OVER THAT COUNTRY.

ARE YOU FOR OR AGAINST THIS IDEA OF PRESIDENT JOHNSON'S?

CHECK ONLY ONE)

_____YES, I AM IN FAVOR OF PRESIDENT JOHNSON'S IDEA TO STAY AND FIGHT IN VIET NAM.

_____NO, I AM AGAINST PRESIDENT JOHNSON'S IDEA TO STAY AND FIGHT IN VIET NAM.

B. Control condition:

THE UNITED STATES SHOULD STAY AND FIGHT IN VIET NAM UNTIL THE COMMUNISTS STOP TRYING TO TAKE OVER THAT COUNTRY.

ARE YOU FOR OR AGAINST THIS IDEA?

(CHECK ONLY ONE)

_____YES, I AM IN FAVOR OF THIS IDEA TO STAY AND FIGHT IN VIET NAM.

_____NO, I AM AGAINST THIS IDEA TO STAY AND FIGHT IN VIET NAM.

Section II: Contradictory Statements Which Were Presented To S's Who Took the Pro Position

YOU HAVE JUST INDICATED THAT YOU ARE IN FAVOR OF STAYING AND FIGHTING IN VIET NAM UNTIL THE COMMUNISTS STOP TRYING TO TAKE OVER THAT COUNTRY.

WE WOULD LIKE TO HAVE YOU ANSWER SOME GENERAL QUESTIONS ABOUT THIS VIET NAM SITUATION. SINCE SOME STUDENTS KNOW MORE ABOUT VIET NAM THAN OTHERS, YOU WILL FIRST READ 13 STATEMENTS ABOUT VIET NAM. EACH OF THESE STATEMENTS IS WRITTEN ON ONE OF THE FOLLOWING PAGES.

READ THESE STATEMENTS ONE AT A TIME--NUMBER 1 THROUGH NUMBER 13. WE WOULD ALSO LIKE TO KNOW HOW IMPORTANT YOU FEEL EACH STATEMENT IS. TO SHOW THIS, PLEASE ANSWER THE QUESTION THAT IS WRITTEN UNDER EACH STATEMENT.

AFTER YOU HAVE READ EACH STATEMENT AND ANSWERED EACH QUESTION--ONE AT A TIME--THEN FILL OUT THE LAST PAGE THAT HAS GENERAL QUESTIONS ABOUT VIET NAM.

Statements....

STATEMENT 1: TOO MANY AMERICANS ARE GETTING KILLED.

STATEMENT 2: THE AMERICAN SOLDIERS ARE KILLING A LARGE NUMBER OF INNOCENT PEOPLE.

STATEMENT 3: THE LEADERS OF THE GOVERNMENT OF VIET NAM ARE NOT VERY HONEST.

STATEMENT 4: WHEN THE AMERICAN SOLDIERS ARRIVED IN VIET NAM, MANY OF THE CHILDREN SPIT ON THEM.

STATEMENT 5: AMERICAN SOLDIERS ARE DOING MORE FIGHTING AND DYING THAN ARE THE SOLDIERS OF VIET NAM.

STATEMENT 6: MOST OF THE PEOPLE OF VIET NAM DO NOT LIKE THE AMERICAN SOLDIERS.

STATEMENT 7: YOU CAN MAKE A PEACEFUL AGREEMENT WITH COMMUNISTS.

STATEMENT 8: THE UNITED STATES DOES NOT ALWAYS HAVE TO FIGHT COMMUNISTS WHENEVER WE GET THE CHANCE.

STATEMENT 9: THE GOVERNMENT OF VIET NAM IS NOT A DEMOCRACY AND IS NOT SUPPORTED BY THE PEOPLE.

STATEMENT 10: HELPING VIET NAM IS NOT WORTH ALL THE MONEY IT IS COSTING.

STATEMENT 11: WE CANNOT WIN NO MATTER HOW HARD WE TRY.

STATEMENT 12: THE PEOPLE OF VIET NAM ONLY WANT TO LIVE IN PEACE.

STATEMENT 13: EVEN IF THE COMMUNISTS WIN IN VIET NAM, THEY WILL NOT GO AFTER OTHER COUNTRIES.

Section II: Contradictory Statements Which Were Presented To S's Who Took the Con Position

YOU HAVE JUST INDICATED THAT YOU ARE AGAINST STAYING AND FIGHTING IN VIET NAM UNTIL THE COMMUNISTS STOP TRYING TO TAKE OVER THAT COUNTRY.

WE WOULD LIKE TO HAVE YOU ANSWER SOME GENERAL QUESTIONS ABOUT THIS VIET NAM SITUATION. SINCE SOME STUDENTS KNOW MORE ABOUT VIET NAM THAN OTHERS, YOU WILL FIRST READ 13 STATEMENTS ABOUT VIET NAM. EACH OF THESE STATEMENTS IS WRITTEN ON ONE OF THE FOLLOWING PAGES.

READ THESE STATEMENTS ONE AT A TIME--NUMBER 1 THROUGH NUMBER 13. WE WOULD ALSO LIKE TO KNOW HOW IMPORTANT YOU FEEL EACH STATEMENT IS. TO SHOW THIS, PLEASE ANSWER THE QUESTION THAT IS WRITTEN UNDER EACH STATEMENT.

AFTER YOU HAVE READ EACH STATEMENT AND ANSWERED EACH QUESTION--ONE AT A TIME--THEN FILL OUT THE LAST PAGE THAT HAS GENERAL QUESTIONS ABOUT VIET NAM.

Statements....

STATEMENT 1: IF THE COMMUNISTS WIN IN VIET NAM, THEY WILL JUST GO AFTER OTHER COUNTRIES.

STATEMENT 2: WE CAN WIN IF WE TRY HARD ENOUGH.

STATEMENT 3: THE LEADERS OF THE GOVERNMENT OF VIET NAM ARE VERY HONEST.

STATEMENT 4: WHEN THE AMERICAN SOLDIERS ARRIVED IN VIET NAM, MANY OF THE CHILDREN WAVED AND SMILED AT THEM.

STATEMENT 5: THE GOVERNMENT OF VIET NAM IS A DEMOCRACY AND IS SUPPORTED BY THE PEOPLE.

STATEMENT 6: MOST OF THE PEOPLE OF VIET NAM LIKE THE AMERICAN SOLDIERS.

STATEMENT 7: YOU CANNOT MAKE A PEACEFUL AGREEMENT WITH COMMUNISTS.

STATEMENT 8: THE UNITED STATES MUST ALWAYS FIGHT THE COMMUNISTS WHEREVER WE GET THE CHANCE.

STATEMENT 9: THE PEOPLE OF VIET NAM DO NOT WANT TO LIVE UNDER THE COMMUNISTS.

STATEMENT 10: THE AMERICAN SOLDIERS ARE KILLING ONLY THE COMMUNISTS.

STATEMENT 11: HELPING VIET NAM IS WORTH ALL THE MONEY IT IS COSTING.

STATEMENT 12: THE SOLDIERS OF VIET NAM ARE REALLY DOING MOST OF THE FIGHTING AND DYING.

STATEMENT 13: NOT VERY MANY AMERICANS ARE GETTING KILLED.

Section III:

C. Determination of subject response to each statement

HOW IMPORTANT DO YOU THINK THIS STATEMENT IS?

FOR EXAMPLE, WOULD YOU NOW SAY THAT--

(MARK ONLY ONE)

_____A. THE UNITED STATES SHOULD STAY AND FIGHT IN VIET NAM.

_____B. THE UNITED STATES SHOULD NOT STAY AND FIGHT IN VIET NAM.

_____C. I'M NOT SURE ONE WAY OR THE OTHER.

APPENDIX III: Two-person game experiment

A. Instructions given to subjects by authority in briefing session (station 1)

My name is Mr. ________. I have developed the game that you will be playing in the next room.

This is a two person game so each of you will be playing the game with another person in this group. You will not know who this other person is.

Each of you will play the game with a box like this one.

This box has been set up for use by one person--Player Y-- who would be playing the game with another person--Player X.

Here is how the game would be played:

(1) This is a trial light. When it comes on Player Y would make his choice.

(2) Player Y could choose A or B.

(3) Meanwhile, Player X would choose C or D.

(4) After everyone has made their choice, one of these four squares will light up to show how many points Player Y won or lost on that trial of the game.

(5) Player Y would then circle the number of points that he had just won or lost on a score sheet.

All of this makes one trial--

(1) The trial light coming on

(2) Then each player making his choice

(3) One of these squares coming on to show how many points were won or lost;

(4) And each player recording this on his score sheet.

The game will be played for 100 of these trials.

Now let me explain these boxes a little more.

As you see, each player can make one of two choices on every trial of the game.

A player like Player Y can choose _A_ or _B_. The _A_ choice is for this row and the _B_ choice for this row.

A player like Player X can choose _C_ or _D_.

On Player Y's box like this one, _X's_ _C_ choice is for this column and _X's_ _D_ choice is for this column.

The points that Player Y can win are listed _first_ in every square and are printed in larger numbers. The smaller numbers that are listed second in every square are what Player X can win.

As you may see, the interesting part of this game is that what Player Y wins depends on _his_ choice _and_ the choice that Player X makes.

Let's take a look at what could happen if Player Y chose A.

(A) Two things could happen:

  (1) Player X may choose C. Then this would be the outcome and Y would lose 20 points and X would win 15 points.

  (2) However, Player X may choose D--Then this would be the outcome and Y would win 20 points and X would get zero.

So if Player Y chose A and this square (I)[1] lit up after everyone made their choice, then Y would know that he lost 20 points because he chose _A_ and Player X chose _C_.

If this square (II) lit up, then Y would know that he won 20 points because he chose _A_ and Player X chose _D_.

That's what could happen if Player Y chose A.

---

[1] Outcome identity--See Figure 3.1

(B) If Player Y chose B, again two things could happen:

(1) This square (III) would light up and then Player Y would know that he won 20 points because he chose B and Player X chose C; or

(2) This square (IV) would light up and then Player Y would know that he lost 20 points because he chose B and Player X chose D.

As you can see, a Player Y can win more points than a Player X. But who gets to be each of these types of players will be decided by chance. Also, the purpose of the game is to win as many points as you can.

There are 4 boxes in the next room--numbered 1 through 4. Each of you will just pick one of these four envelopes and take that position. Two of you will be players like Y and you will be playing with another person in the group who will be a player like X. These envelopes contain a short questionnaire for you to fill out and a score sheet that you will use to keep track of how many points you win or lose on each trial of the game.

(TREATMENT ONLY:) We also want to know how two people play the game when one person has additional information about it and the other does not. So I have also put additional information in two of the four envelopes. The people who become players like Y, will get this additional information. Those who pick envelopes for positions like Player X's will not get this additional information.

Are there any questions?

(IF NOT, THEN ASK SUBJECTS WHAT OUTCOMES WOULD RESULT FOR EACH COMBINATION OF CHOICES.)

Appendix III:

B. Authority Treatment (Additional Information)

I HAD A LARGE NUMBER OF PEOPLE PLAY THIS GAME AS I WAS DEVELOPING IT.

I DISCOVERED THAT PLAYER X WILL PLAY THE GAME A CERTAIN WAY.

ALL PEOPLE WHO TAKE THE POSITION OF PLAYER X WILL CHOOSE C MUCH MORE OFTEN THAN THEY CHOOSE D.

THEREFORE, YOU----AS PLAYER Y---
WILL WIN AS MANY POINTS AS POSSIBLE
IF YOU ALWAYS CHOOSE B
AND WIN @) POINTS.

	PLAYER X	
	C	D
PLAYER Y	-20,+15	+20,0
	+20,+5	-20,-15

SIGNED:

(NAME OF EXPERIMENTER)

APPENDIX IV. RESULTS OF THE PRELIMINARY ANALYSIS

The tables which appear in this appendix summarize the results of the preliminary analysis. The results for the preliminary analysis are based on the scores of all subjects in the test population. Subjects from this population were categorized as open or closed mined if they scored below or above the over-all mean for dogmatism scores. The results of the preliminary analysis therefore differ in this important respect from the results reported in the text of the dissertation: While all subjects are included in the preliminary analysis only a subgroup of the test population (i.e. those who scored extremely high or extremely low on the Dogmatism Scale) are included in the analysis which is reported in the text of this dissertation. The results of the preliminary analysis differ in two other respects from the results which are reported in the accompanying text. The dependent measures which I have used in the re-analysis of the data are not identical with the measures which I initially used. This discrepency exists because I did not initially have a clear conceptual definition for the dependent measures. The following discrepencies should be noted by the reader: (1) In the preliminary analysis, I did not have or use a measure of initial acceptance of the authority's information; (2) three separate measures of synthesis were used in the preliminary analysis of data from the PI experiment. All three measures of synthesis which were used in the preliminary analysis differ from the measure of synthesis which was used in the re-analysis. The three different measures which were used for synthesis in the PI experiment are (1) the number of times the S kept his original position; (2) the number of times the S took the "uncertain" position; and (3) the number of times the S took the opposite position. The final respect in which the preliminary analysis differs from the re-analysis is that the *S's* grade level was considered as an experimental factor in the preliminary analysis.

TABLE IV-1
SUBGROUP MEAN DOGMATISM SCORES: DOGMATISM BY GRADE

Grouped Dogmatism Level[b]	Grouped Grade Level[a] High	Low	Totals
High	26.36 (2.96)[c] (226)[d]	26.55 (3.10) (250)	26.46 (3.03) (476)
Low	17.01 (3.62) (372)	18.13 (3.12) (203)	17.40 (3.52) (575)
Totals	20.54 (5.67) (598)	22.78 (5.20) (453)	21.51 (5.56) (1051)

[a] "High" equals eleventh (31.40%) and twelfth (25.50%) grade students. "Low" equals ninth (12.75%) and tenth (30.35%) grade students.

[b] Mean split: "High" ≥ 23; "Low" ≤ 22.

[c] (s)

[d] (n)

TABLE IV-2
ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE *ANALYSIS* STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE I).

Source	SS	df	MS	F	$p<$
Dogmatism	8.85	1	8.85		
Grade	1.79	1	1.79		
Expert Power	366.09	1	366.09	46.58	.01
D X G	15.48	1	15.48	1.96	.25
G X EP	6.51	1	6.51		
D X EP	9.53	1	9.53	1.21	--
D X G X EP	6.09	1	6.09		
Error (w. cell)	1179.25	150	7.86		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	5.54 (2.72)[a] (11)[b]	4.62 (3.02) (24)	2.71 (2.06) (14)	1.76 (1.22) (17)
Low	5.48 (3.28) (35)	6.83 (4.58) (12)	2.43 (2.09) (35)	2.00 (1.34) (10)

[a] (s)

[b] (n)

TABLE IV-3
ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE *ANALYSIS* STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE II).

Source	SS	df	MS	F	$p<$
Dogmatism	.28	1	.28		
Grade	5.56	1	5.56		
Export Power	636.45	1	636.45	27.54	.01
D X G	61.10	1	61.10	2.64	.25
G X EP	1.00	1	1.00		
D X EP	8.86	1	8.86	.38	--
D X G X EP	49.02	1	49.02	2.12	.25
Error (w. cell)	2703.94	117	23.11		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	9.33 (6.36)[a] (12)[b]	5.65 (4.22) (17)	2.00 (.63) (5)	1.56 (.87) (16)
Low	5.62 (4.01) (21)	7.94 (9.01) (18)	2.33 (1.61) (27)	2.22 (1.93) (9)

[a] (s)

[b] (n)

TABLE IV-4

ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE III).

Source	SS	df	MS	F	p<
Dogmatism	8.01	1	8.01		
Grade	19.54	1	19.54	.87	--
Expert Power	411.25	1	411.24	18.22	.01
D X G	1.00	1	1.00		
G X EP	9.16	1	9.16		
D X EP	73.59	1	73.59	3.26	.10
D X G X EP	53.52	1	53.52	2.37	.25
Error (w. cell)	1986.20	88	22.57		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	10.00 (6.00)^a (5)^b	6.38 (3.23) (8)	1.00 (1.00) (6)	2.13 (.96) (15)
Low	5.47 (3.72) (15)	5.67 (1.82) (9)	3.77 (8.10) (22)	2.00 (1.27) (16)

[a] (s)

[b] (n)

TABLE IV-5

ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. PI EXPERIMENT (PRO POSITION).

Source	SS	df	MS	F	p
Dogmatism	13.40	1	13.40		
Grade	.01	1	.01		
Expert Power	40.47	1	40.74		
D X G	.07	1	.07		
G X EP	42.72	1	42.72	.02	ns
D X EP	7.78	1	7.78		
D X G X EP	3.68	1	3.68		
Error (w. cell)	636661.77	321	1983.37		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	4.68 (2.71)[a] (35)[b]	4.11 (3.34) (36)	4.56 (2.95) (32)	5.05 (3.18) (43)
Low	4.97 (3.01) (61)	4.02 (3.12) (40)	5.05 (3.31) (58)	6.04 (3.30) (24)

[a] (s)

[b] (n)

TABLE IV-6

ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE ANALYSIS STAGE OF DECISION MAKING IS COMPLETED. PI EXPERIMENT (CON POSITION).

Source	SS	df	MS	F	p<
Dogmatism	16.42	1	16.42	3.33	.10
Grade	1.62	1	1.62		
Expert Power	.32	1	.32		
D X G	4.41	1	4.41	.89	--
G X EP	1.07	1	1.07		
D X EP	.95	1	.95		
D X G X EP	8.92	1	8.92	1.80	.25
Error (w. cell)	700.28	142	4.93		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	2.37 (2.00)[a] (19)[b]	2.13 (2.36) (23)	2.44 (2.34) (16)	1.54 (.73) (22)
Low	3.02 (2.82) (23)	2.50 (1.94) (12)	2.43 (1.67) (23)	3.25 (2.95) (12)

[a] (s)

[b] (n)

TABLE IV-7

ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE I).

Source	SS	df	MS	F	p
Dogmatism	107.11	1	107.11		
Grade	12.23	1	12.23		
Expert Power	86.08	1	86.08		
D X G	158.18	1	158.18		
G X EP	113.62	1	113.62		
D X EP	177.91	1	177.91	1.18	ns
D X G X EP	5.78	1	5.78		
Error (w. cell)	22566.01	150	150.44		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	15.27 (11.90)[a] (11)[b]	17.25 (16.51) (24)	18.14 (14.44) (14)	12.94 (9.59) (17)
Low	10.54 (5.65) (35)	13.58 (5.48) (12)	14.74 (13.91) (35)	17.40 (13.20) (10)

[a] (s)

[b] (n)

TABLE IV-8

ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE II).

Source	SS	df	MS	F	p
Dogmatism	606.29	1	606.29	1.79	<.25
Grade	2.99	1	2.99		
Expert Power	.002	1	.002		
D X G	257.70	1	257.70	.76	--
G X EP	945.42	1	945.42	2.79	.10
D X EP	1293.03	1	1293.03	3.82	<.10
D X G X EP	.14	1	.14		
Error (w. cell)	39634.35	117	338.76		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	29.83 (15.44)[a] (12)[b]	32.53 (20.13) (17)	43.50 (27.50) (5)	33.50 (21.79) (16)
Low	28.95 (13.42) (21)	38.00 (20.58) (18)	27.81 (15.17) (27)	24.56 (9.88) (9)

[a] (s)

[b] (n)

TABLE IV-9
ANALYSIS OF VARIANCE OF THE TRIAL NUMBER AT WHICH THE SYNTHESIS STAGE OF DECISION MAKING IS COMPLETED. TPG EXPERIMENT (REINFORCEMENT SCHEDULE III).

Source	SS	df	MS	F	p
Dogmatism	331.70	1	331.70	.71	ns
Grade	39.73	1	39.73		
Expert Power	1.26	1	1.26		
D X G	63.33	1	63.33		
G X EP	291.75	1	291.75		
D X EP	97.49	1	97.49		
D X G X EP	252.96	1	252.96		
Error (w. cell)	41063.75	88	466.63		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	45.60 (5.24)[a] (5)[b]	34.75 (14.14) (8)	35.50 (25.79) (6)	39.80 (19.46) (15)
Low	33.67 (17.78) (15)	33.78 (14.79) (9)	35.41 (22.01) (22)	36.06 (27.71) (16)

[a] (s)

[b] (n)

TABLE IV-10

ANALYSIS OF VARIANCE OF THE NUMBER OF TIMES THE S KEPT HIS ORIGINAL POSITION. SYNTHESIS MEASURE I. PI EXPERIMENT (PRO POSITION).

Source	SS	df	MS	F	p<
Dogmatism	32.13	1	32.13	2.81	.10
Grade	0	1	--		
Expert Power	3.48	1	3.48		
D X G	.15	1	.15		
G X EP	18.63	1	18.63	1.62	.25
D X EP	5.09	1	5.09	.45	--
D X G X EP	40.66	1	40.66	3.55	.10
Error (w. cell)	7918.87	692	11.44		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	9.12 (3.27)[a] (69)[b]	9.31 (3.61) (75)	9.25 (3.34) (75)	9.12 (3.40) (86)
Low	9.91 (2.88) (128)	9.05 (3.58) (73)	9.40 (3.54) (125)	10.20 (3.37) (69)

[a] (s)

[b] (n)

TABLE IV-11
ANALYSIS OF VARIANCE OF THE NUMBER OF TIMES THE S TOOK THE "UNCERTAIN" POSITION. SYNTHESIS MEASURE II. PI EXPERIMENT (PRO POSITION).

Source	SS	df	MS	F	p<
Dogmatism	17.53	1	17.53	2.87	.10
Grade	0	1	--		
Expert Power	3.25	1	3.25	.53	
D X G	8.79	1	8.79	1.44	.25
G X EP	1.83	1	1.83		
D X EP	1.83	1	1.83		
D X G X EP	.41	1	.41		
Error (w. cell)	4221.80	692	6.10		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	2.26 (2.38)[a] (69)[b]	2.09 (2.64) (75)	2.56 (2.61) (75)	2.28 (2.26) (86)
Low	1.76 (2.02) (128)	2.15 (2.84) (73)	1.95 (2.46) (125)	2.03 (2.66) (69)

[a] (s)

[b] (n)

TABLE IV-12

ANALYSIS OF VARIANCE OF THE NUMBER OF TIMES THE S TOOK THE OPPOSITE POSITION. SYNTHESIS MEASURE III. PI EXPERIMENT (PRO POSITION).

Source	SS	df	MS	F	p<
Dogmatism	2.80	1	2.80	.67	--
Grade	.33	1	.33		
Expert Power	15.44	1	15.44	3.68	.10
D X G	3.03	1	3.03		
G X EP	8.04	1	8.04	1.91	.25
D X EP	2.60	1	2.60		
D X G X EP	10.36	1	10.36	2.46	.25
Error (w. cell)	2906.86	692	4.20		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	1.45 (2.08)[a] (69)[b]	1.60 (2.25) (75)	1.25 (1.73) (75)	1.45 (2.05) (86)
Low	1.33 (1.92) (128)	1.71 (2.24) (73)	1.37 (2.26) (125)	.81 (1.57) (69)

[a] (s)

[b] (n)

TABLE IV-13

ANALYSIS OF VARIANCE OF THE NUMBER OF TIMES THE *S* KEPT HIS ORIGINAL POSITION. *SYNTHESIS MEASURE I*. PI EXPERIMENT (CON POSITION).

Source	SS	df	MS	F	p<
Dogmatism	79.67	1	79.67	5.24	.05
Grade	117.35	1	117.35	7.72	.01
Expert Power	2.28	1	2.28	.15	--
D X G	43.38	1	43.38	2.85	.25
G X EP	1.59	1	1.59		
D X EP	54.97	1	54.97	3.61	.10
D X G X EP	1.09	1	1.09		
Error (w. cell)	3315.72	218	15.21		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	7.50 (3.60)[a] (28)[b]	5.11 (3.58) (27)	8.35 (4.39) (31)	5.90 (4.23) (31)
Low	8.71 (3.64) (41)	8.44 (3.41) (18)	7.79 (3.96) (34)	6.88 (3.28) (16)

[a] (s)

[b] (n)

TABLE IV-14
ANALYSIS OF VARIANCE OF THE NUMBER OF TIMES THE S TOOK THE "UNCERTAIN" POSITION. SYNTHESIS MEASURE II. PI EXPERIMENT (CON POSITION).

Source	SS	df	MS	F	p<
Dogmatism	11.94	1	11.94	1.61	.25
Grade	10.49	1	10.49	1.41	.25
Expert Power	2.74	1	2.74		
D X G	5.31	1	5.31	.71	--
G X EP	.13	1	.13		
D X EP	16.25	1	16.25	2.19	.25
D X G X EP	.52	1	.52		
Error (w. cell)	1619.02	218	7.43		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	2.82 (2.61)[a] (28)[b]	3.74 (2.73) (27)	2.64 (3.35) (31)	3.26 (2.32) (31)
Low	2.20 (2.62) (41)	2.28 (1.91) (18)	2.94 (2.88) (34)	3.12 (2.67) (16)

[a] (s)

[b] (n)

TABLE IV-15
ANALYSIS OF VARIANCE OF THE NUMBER OF TIMES THE S TOOK THE OPPOSITE POSITION. SYNTHESIS MEASURE III. PI EXPERIMENT (CON POSITION).

Source	SS	df	MS	F	p<
Dogmatism	45.30	1	45.30	4.89	.05
Grade	57.67	1	57.67	6.23	.05
Expert Power	1.68	1	1.68		
D X G	10.72	1	10.72	1.16	--
G X EP	6.35	1	6.35	6.35	
D X EP	14.55	1	14.55	1.57	.25
D X G X EP	.02	1	.02		
Error (w. cell)	2017.81	218	9.26		

Subgroup Means

	Treatment		Control	
	Grade		Grade	
Dogmatism	High	Low	High	Low
High	3.04 (3.33)[a] (28)[b]	4.22 (3.52) (27)	2.00 (2.63) (31)	3.84 (3.80) (31)
Low	2.05 (2.90) (41)	2.28 (2.55) (18)	2.03 (1.88) (34)	3.00 (2.64) (16)

[a] (s)

[b] (n)